Levin-Richmond Terminal Corporation
402 Wright Avenue, Richmond, California 94804
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August 31, 2017

Ms. Karen Jurist
United States Environmental Protection Agency Region 9
75 Hawthorne Street
San Francisco, California 94105
Via email: jurist.karen@epa.gov

RE: 2016-2017 Annual Report, United Heckathorn Superfund Site, Upland Capping System
Richmond, California

Dear Ms. Jurist:

Enclosed please find the 2016-2017 Annual Report for the Upland Capping System at the United Heckathorn Superfund Site.

Please feel free to contact me if you have any questions or concerns with the attached report.

Sincerely,

Jim Holland
Vice President of Facilities, Equipment, and Environmental Officer
Levin Richmond Terminal Corporation
(510) 307-4076

Enclosure: 2016-2017 Annual Report for United Heckathorn Superfund Site Upland Capping System

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2016-2017 Annual Report

United Heckathorn Superfund Site
Upland Capping System
Richmond, California

August 31, 2017
Rev. 0

prepared for:

Levin Richmond Terminal Corporation
402 Wright Avenue
Richmond, California 94804

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2016-2017 Annual Report

United Heckathorn Superfund Site
Upland Capping System
Richmond, California

August 25, 2017
Rev. 0

prepared by:

CDIM Engineering, Inc.
45 Polk Street, 3rd Floor
San Francisco, CA 94102

CDIM's work for the Levin Richmond Terminal Corporation was conducted under my supervision. To the best of my knowledge, the data contained herein are true and accurate, are based on what can be reasonably understood as a result of this project, and satisfy the scope of work prescribed by the client for this project. The data, findings, recommendations, specifications, or professional opinions were prepared solely for the use of the Levin Richmond Terminal Corporation in accordance with generally accepted processional engineering and geologic practice. We make no other warranty, either expressed or implied, and are not responsible for the interpretation by others of the contents herein.

Scott Bourne, PE #C72817
Principal Engineer

August 31, 2017
Date

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ACRONYMS AND ABBREVIATIONS

BMP	best management practices
CDIM	CDIM Engineering, Inc.
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
EPA	United States Environmental Protection Agency
gpm	gallons per minute
Heckathorn site or Site	United Heckathorn Superfund Site
IGP	Storm Water Industrial General Permit
LRT	Levin Richmond Terminal
LRTC	Levin Richmond Terminal Corporation
MDL	method detection limit
MLLW	mean lower low water
msl	mean sea level
NAL	numeric action level
NPDES	National Pollutant Discharge Elimination System
O&G	oil and grease
O&M	operations and maintenance
O&M Plan	*Revised Draft Operations and Maintenance Plan, Upland Capping System, Former United Heckathorn Site*
pg/L	picograms per liter
ROD	Record of Decision
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resource Control Board
Third Five-Year Review	*Third Five-Year Review Report for United Heckathorn Superfund Site, Richmond, California*
TS-2	advanced storm water treatment system TS-2
TSS	total suspended solids
µg/L	micrograms per liter

1 INTRODUCTION

On behalf of the Levin Richmond Terminal Corporation (LRTC), CDIM Engineering, Inc. (CDIM) prepared this 2016-2017 Annual Report to describe inspection, monitoring, and maintenance performed on the upland cap at the United Heckathorn Superfund Site (the Heckathorn Site).

1.1 Background

From 1947 through 1966, the Heckathorn Site was used for formulation, processing, packaging, and shipping of pesticides including aldrin, dichlorodiphenyltrichloroethane (DDT), dieldrin, and endrin. These activities resulted in the release of pesticides to the surrounding soils and to the Lauritzen Channel. In 1994, after remedial investigation and feasibility studies were completed, the United States Environmental Protection Agency (EPA) adopted a Record of Decision (ROD) for remedial action requiring:

- Dredging of all soft bay mud from the Lauritzen Channel and Parr Canal, with offsite disposal of dredged material;
- Placement of clean material after dredging;
- Construction of a cap at and around the former Heckathorn facility to prevent erosion;
- A deed restriction limiting the property at the former Heckathorn facility location to non-residential uses; and,
- Marine monitoring to verify the effectiveness of the remedy (EPA, 1994b).

In 1996, LRTC entered a Consent Decree[1] with the EPA, which outlined LRTC's responsibility to design, construct, and maintain a concrete cap at and around the former Heckathorn facility to prevent erosion (United States District Court, 1996a). LRTC completed construction of the concrete cap in July 1999 (PES, 1999b.)

Since the cap was constructed, EPA has completed four five-year reviews and has found the upland remedial action is functioning as intended, is protective of human health and the environment, and has met the remedial action objective for the upland area due to capping of contaminated soils, which has eliminated human exposure pathways and prevented erosion (EPA, 2016a).

1.2 Program Objectives

In order to ensure long-term protection of human health and the environment, the remedial action goal established by the EPA for upland and embankment soils is the prevention of erosion and transport into the Lauritzen Channel (EPA, 1994a).

[1] Montrose Chemical Corporation of California, Chris-Craft Industrial, Rhone-Poulenc, Inc. and Stauffer Management Company (collectively the "Montrose Group") entered into a separate Consent Decree with EPA for dredging of young bay mud from the Lauritzen Channel and Parr Canal, with offsite disposal of dredged material and placement of clean fill after dredging (United States District Court, 1996b).

The upland cap was designed to prevent the release of residual chlorinated pesticides that are present in soils (PES, 1998).

The objective of the cap inspection and storm water monitoring programs is to identify any potential release of pesticide-impacted soil by examining the integrity of the cap system through visual inspection and storm water monitoring (EPA, 2011).

1.3 Operation and Maintenance Program

LRTC performs operations and maintenance (O&M) activities in accordance with the *Revised Draft Operations and Maintenance Plan, Upland Capping System, Former United Heckathorn Site* (O&M Plan; PES, 1999a). LRTC performs additional O&M activities recommended by EPA in the *Third Five-Year Review Report for United Heckathorn Superfund Site, Richmond, California* (Third Five-Year Review; EPA, 2011) to provide added confidence that the upland area remedy maintains its effectiveness.

1.4 Contents of this Report

This Annual Report describes activities performed by LRTC to inspect, monitor and maintain the upland cap for the period of July 1, 2016 to June 30, 2017. Included is a summary of each of the following:

- Capping system maintenance activities;
- Storm water collection system inspection and cleaning;
- Storm water system monitoring;
- Storm water treatment;
- Triennial cap survey;
- Annual cap inspection;
- Proposed site work for 2017-2018; and,
- A conclusion with CDIM's opinion as to the overall condition and effectiveness of the cap in meeting the program objectives.

2 SITE DESCRIPTION

The Levin Richmond Terminal (LRT) is located at 402 Wright Avenue in Richmond, California and is immediately adjacent to the Lauritzen Channel in the Richmond Harbor (Figure 1). The Heckathorn Site includes the northern five acres of the Main Terminal at LRT, known as the upland cap area (Figure 2).

2.1 Upland Area Description and Current Use

The upland cap area is bounded by a railroad track and Cutting Boulevard to the north; South Fourth Street to the east; the LRT and Santa Fe Channel to the south; and, the Lauritzen Channel to the west. The majority of the upland cap area is relatively flat with surface elevations of approximately 9 feet above mean sea level (msl), with the exception of the portion of the upland cap area north of the Lauritzen Channel, which was raised to approximately 15 feet above msl during cap construction.

The upland cap area is used primarily for storage of dry bulk product and railroad operations. Photographs taken during the site inspection are included in Appendix A.

2.2 Nearby Water Bodies

The storm water system in the upland cap area discharges directly to the Lauritzen Channel (Figure 2). The Lauritzen Channel is connected to the San Francisco Bay via the Santa Fe Channel and Richmond Inner Harbor.

2.3 Upland Area Cap

Construction of the concrete cap at the upland cap area began in July 1998 and was completed in July 1999 (PES, 1999b). Installation of the cap consisted of: (1) site grading to promote surface runoff to collection points; (2) installation of a drainage system to collect surface runoff, including best management practices (BMPs) for storm water pollution prevention; and (3) construction of a reinforced concrete cap in the majority of the 5-acre area and construction of a geotextile fabric and gravel cap in the railroad track area (Figure 2). The concrete cap consists of a minimum 6-inch thick concrete with a double layer of welded wire fabric reinforcement. The gravel cover consists of a geotextile fabric over a prepared subgrade. The geotextile fabric is covered by a 6-inch layer of gravel.

2.4 Storm Water Collection and Advanced Treatment

The facility is paved with asphalt and concrete and is graded to direct surface water runoff via sheet flow or shallow swales to drop inlets (Figure 3). The drop inlets drain to five below-grade interceptors[2] (SW-3 through SW-7) via underground pipe. The interceptors are equipped with compartments and steel baffles to allow the

[2] The interceptors design was based on a five-minute retention time during a 10-year, 24-hour storm event (PES, 1999a).

settling of sediments and separation of oil/grease and floatables, and also with normally-closed gate valves at the effluent pipe, which can be opened during heavy rains to enable discharge to the Lauritzen Channel.

In 2015, LRTC completed modifications[3] to the upland cap area storm water collection system and installation of advanced storm water treatment system TS-2 (TS-2). Single-speed submersible pumps placed into final chamber of each interceptor were connected to newly installed storm drain pipe along the edge of the LRTC pier. During storm events, the submersible pumps push storm water captured by interceptors SW-3 to SW-7 through an inline static mixer where a biopolymer flocculant is added. Storm water then flows into a series of two 21,000-gallon aboveground clarification tanks, where the flocculant and solids separate from the water. Storm water overflows from the second clarifier and is pumped through four, 48-inch diameter sand filters. Effluent from the treatment system then is discharged to the Lauritzen Channel at the interceptor SW-5 outfall. TS-2 is equipped with variable speed drive for pump control, a programmable logic controller, and a human machine interface.

The estimated flow for the SW-3 to SW-7 catchments that results from a 0.2 inches per hour design storm intensity[4] is approximately 500 gallons per minute (gpm). TS-2 is designed to treat approximately 650 gpm, or approximately 130% of the IGP-required flow. Additionally, due to the storage volume provided by interceptors, clarifiers and equalization tank, the system is able to capture and treat periods of storm water flow in excess of 650 gpm before treatment bypass occurs.

[3] The storm water treatment system was described in the 2014-2015 annual report and a telephone conversation (December 26, 2014) and email correspondence (January 26, 2016) between Rachelle Thompson of EPA and Scott Bourne, formerly of Weiss Associates.

[4] Design criteria for flow-based treatment established in IGP (SWRCB, 2014).

3 OPERATION AND MAINTENANCE

3.1 Upland Cap Maintenance

During the 2016-2017 reporting year, LRTC monitored the performance of concrete cap and gravel cover in accordance with recommendations contained in the 2015-2016 Annual Report (CDIM, 2016a). Deteriorating concrete identified in the southern portion of the eastern swale of the Main Terminal was observed to remain intact (Appendix A; Photo 12). LRTC continuously monitored other cracks, seals, and joints for signs of propagation and/or degradation. No evidence of exposed underlying soil was observed. The upland cap functioned as designed and no major maintenance or repair of the cap was conducted during the current reported period.

LRTC continued two projects during the reporting period which involved the upland cap: 1) installation of a roadway across three railroad tracks in the northern portion of the upland cap area (Appendix A; Photos 17, 19); and 2) installation of new concrete and fencing along the western edge of the cap in an area previously covered by wood timbers (Appendix A; Photos 2, 4) (Figure 3). These construction activities were undertaken to widen the existing roadway and provide additional drainage control. Work was performed during dry-weather conditions and neither activity resulted in the disturbance of underlying soil.

3.2 Storm Water Collection System Inspection and Cleaning

LRTC inspected the storm drain inlets, interceptors and clarifier tanks prior to the rainy season, and monthly throughout the reporting year in per its Storm Water Pollution Prevention Plan (SWPPP; CDIM, 2016b). Storm water interceptors and clarifier tanks are cleaned before the start of the rainy season. Drain inlets and inlet filters are cleaned and replaced as-needed throughout the year. Accumulated material removed from the inlets, interceptors and clarifier tanks appeared to be bulk product, which LRTC returned to the bulk product piles.

3.3 Storm Water Monitoring

The objective of the storm water monitoring program is to verify the cap is effectively preventing erosion, reducing the potential for storm water contact with soils containing residual pesticides, and reducing the potential for release of residual pesticides to the Lauritzen Channel. This section describes storm water sampling, results, quality assurance/quality control procedures. It includes an assessment of results.

3.3.1 Storm Water Sampling

During the 2016-2017 reporting year, LRTC sampled industrial storm water discharges in accordance with State Water Resources Control Board (SWRCB) Water Quality Order No. 2014-0057-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001, *General Permit for Storm Water Discharges Associated with Industrial Activities* (IGP; SWRCB, 2014); the O&M Plan (PES, 1999a); and, a Consent Decree between San Francisco Baykeeper and the Levin Richmond Terminal Corporation (United States District Court, 2014). Storm water monitoring requirements are documented in LRTC's SWPPP.

Prior to 2015, LRTC collected samples from interceptors SW-3 through SW-7. Since installing advanced treatment system TS-2, LRTC no longer regularly discharges storm water at these locations. As a result, LRTC

now collects storm water samples from the TS-2 influent and effluent.[5] In the event that elevated pesticides are detected in the TS-2 influent or effluent, LRTC is prepared to sample at interceptors SW-3 through SW-7.

The O&M Plan specifies that storm water samples be analyzed using EPA Method 8080. In previous years, storm water samples were analyzed for Method 8080 analytes using standard and low-level EPA Method 8081A to achieve lower method detection limits. In the fourth five-year review, the EPA recommended that analytical methods with detection limits lower than the marine surface water cleanup levels be used to allow for more meaningful evaluation of analytical data (EPA, 2016a). In an October 5, 2016 email from EPA, it was requested that samples from TS-2 be analyzed using EPA Method 1699 to achieve ultra-low detection limits (EPA, 2016b).

Storm water samples were submitted to Vista Analytical in El Dorado Hills, California for pesticide analysis by EPA Method 1699. Storm water samples were also submitted to Curtis & Tompkins in Berkeley, California and Eurofins CalScience Environmental Laboratories in Concord, California for the following analyses: pH by EPA Method 9040C, total suspended solids (TSS) by Standard Method 2540D, oil and grease (O&G) by EPA 1644A, and metals by EPA Method 200.7/200.8. Original laboratory reports, including applicable chain-of-custody forms, are included in Appendix B.[6]

3.3.2 Sample Results

During the 2016-2017 reporting year, storm water from the combined TS-2 influent and effluent was sampled during four storm events: October 14, 2016; December 8, 2016; January 3, 2017; and, January 18, 2017. The October 14, 2016 sampling event occurred during the first storm event (1.29 total inches of rainfall)[7] producing discharge for the 2016-2017 rainy season; its results represent the year's first flush.

3.3.2.1 Effluent Sample Results

Tables 1 and 2 show laboratory analytical results for pesticides and general parameters/metals, respectively. Pesticides were detected in the treated storm water discharge samples (TS2-E) from each of the four sampling events during the 2016-2017 reporting year. Total DDT[8] was detected at concentrations ranging from 2,063 to 2,457 picograms per liter (pg/L); dieldrin was detected at concentrations from 1,300 to 2,770 pg/L.

Iron was detected in the January 3, 2017 TS-2 discharge sample above the IGP numeric action level (NAL) of 1,000 micrograms per liter (µg/L). TS-2 discharge results for all other pollutants (metals, O&G pH and TSS) were below the NALs during the 2016-2017 reporting year.

[5] Changes to storm water monitoring were discussed during a telephone conversation on November 3, 2015 between Rachelle Thompson of EPA and Scott Bourne of Weiss Associates.

[6] Laboratory analytical reports include data for storm water discharge points at LRT other than the upland cap area (TS1-E, TS3-E, TS4-E).

[7] Rainfall data from LRTC rain gauge.

[8] Total DDT represents the sum of detected concentrations of the 4,4' and 2,4'- isomers of DDT, DDD, and DDE and/or detection limits for non-detected compounds.

3.3.2.2 Influent Sample Results

Samples of the combined influent to TS-2 (TS2-I) were collected during each of the four events. Influent samples were composited using the SW-3, SW-4, and the combined SW-5/6/7 influent feeds; volume from each feed was calculated based on estimated runoff contribution to TS-2 discharge. Total DDT was detected at concentrations ranging from 35,469 to 147,040 pg/L; dieldrin was detected at concentrations from 3,190 to 7,310 pg/L.

3.3.3 Quality Assurance/Quality Control

The O&M Plan stipulates that at least one duplicate sample be collected for analysis by EPA Method 8080 per storm sampling event. However, due to the change to EPA Method 1699, it was determined that a duplicate pesticide sample was no longer necessary. EPA Method 1699 employs high-resolution gas chromatography/high-resolution mass spectrometry with isotope dilution and internal standard quantification techniques to provide improved sensitivity and data quality. In future years, a duplicate sample can be collected upon EPA request. A duplicate sample for general parameters and metals was collected during the January 18, 2017 event.

Laboratory method detection limits (MDLs) for each DDT isomer, and the sum of the MDLs for all DDT isomers, were below the total DDT final surface water remediation level of 590 pg/L established in the ROD (EPA, 1994b) for all events. The MDLs for dieldrin were below the final surface water remediation level of 140 pg/L.

No data quality issues were reported through the data validation process. Based on the data validation process, the data resulting from sampling and analysis are acceptable and complete.

3.3.4 Assessment of Results

Pesticides were detected in all TS-2 influent and effluent samples during the 2016-2017 reporting year. The implementation of EPA Method 1699 significantly reduced detection limits for all DDT isomers, resulting in an increased number of detections and more precise data. Using EPA Method 8081A, the sum of the detection limits for all DDT isomers was 3,500 pg/L. In 2016-2017, the total detected DDT concentration was below the previous detection limit, with concentrations ranging from 2,063 to 2,457 pg/L. Influent concentrations from 2016-2017 were higher than influent concentrations from 2015-2016, but were generally consistent with historical effluent data from interceptors SW-3 to SW-7 prior to implementation of TS-2.

Sample results from the 2016-2017 reporting year show that TS-2 is effective at reducing concentrations of Total DDT, TSS and metals.

Figure 4 presents the trend chart for influent and effluent DDT[9] concentrations from October 2015 to present. It provides both detected concentrations and non-detect results.[10] Prior to the 2015-2016 reporting year, storm water discharged from the upland area via individual interceptors. Concentration trend charts for DDT and dieldrin for individual storm water discharge locations from 2011 to 2015 are contained in the 2014-2015 Annual Report (Weiss, 2015a).

[9] Note that plotted DDT values are for the sum of the 4,4'- and 2,4'- isomers of DDT, DDD, and DDE.
[10] Denoted by "<*n*", where *n* is the sum of the DDT, DDD, and DDE detection limits, if available, or reporting limit otherwise.

3.4 Storm Water Treatment System Operation

LRT received approximately 37 inches of rainfall[11] during the 2016-2017 reporting period. LRTC reports that TS-2 provided sufficient treatment capacity to prevent treatment system bypass for all periods where its operation was observed. No significant operation and maintenance concerns were encountered. Sample results show that TS-2 is effective at reducing effluent TSS and pesticide concentrations.

[11] Rainfall from LRTC rain gauge.

4 ANNUAL SITE INSPECTION

Representatives of LRTC and CDIM inspected the upland cap on June 8, 2017. The inspection included visual observations of the concrete cap, gravel cover, and drainage system throughout the observable extent of the upland cap area. During a separate site visit on July 11, 2017, the cap in the bulk product storage area was inspected. Appendix A includes photographs taken during the inspections. Figure 3 shows the locations of photographs. Appendix C includes the inspection form.

4.1 Concrete Cap Inspection

Visual inspections concentrated on identifying signs of deterioration and exposure of the underlying subgrade at cracks, joints, high-loading areas, gravel and cap penetrations. Areas identified in the Third Five-Year Review (EPA, 2011) and the 2015-2016 Annual Report (CDIM, 2016a) with cracks and potential settlement were reexamined.

- **SW-3 Area** – Minor surficial cracks were observed to the west of the bulk product area, with some heavier cracks and seams south of interceptor SW-4 (Appendix A; Photos 1, 3). In the bulk product storage area, surficial cracks and seams were seen throughout (Appendix A; Photos 29, 30, and 31). Inspection of the northern end of the bulk product storage area was limited due to residual bulk material that obscured the cap surface (Appendix A; Photo 32). Additional concrete placed during the 2016-2017 reporting year was observed along the western edge of the SW-3 area (Appendix A; Photos 2 and 4).
- **SW-4 Area** – Areas of minor surficial cracks were observed throughout the SW-4 area. Cracks and seams were noted extending from the southeast corner of interceptor SW-4 toward the east and surrounding drain inlet 4DI-19 (Appendix A; Photos 5, 6, 9, and 10). Additional concrete placed along the western edge of SW-4 during the 2016-2017 reporting year was also observed (Appendix A; Photos 2, 4).
- **SW-5 Area** – Minor cracks were noted surrounding interceptor SW-5 and treatment system TS-2. Small areas of concrete deterioration were observed in the southern portion of the eastern swale of the Main Terminal; no changed noted from previous year's inspection (Appendix A; Photo 12).
- **SW-6 Area** – Minor cracks were noted north and northeast of interceptor SW-6 (Appendix A; Photo 26), east of the rail tracks (Appendix A; Photos 20, 21, and 22), and along the eastern swale of the Main Terminal (Appendix A; Photos 27 and 28). Additional construction of the new road was observed (Appendix A; Photos 17 and 19).
- **SW-7 Area** – Minor surficial cracks were observed in this area (Photo 25).

No evidence of differential settling or vertical displacement was observed. No evidence of cracks, gaps, significant cap deterioration, or other material breach with apparent potential for exposure of the underlying subgrade was observed during the inspection. CDIM recommends that LRTC continue to monitor cracks and deterioration noted during the inspection. No repairs are required at this time.

4.2 Gravel Cover Inspection

Visual observations of the gravel cover concentrated on identifying areas where gravel cover was thin. A geotextile membrane underlies the gravel cover, but was not visually observed in any of the areas inspected. Below is a summary of observations from the concrete cap inspection.

- **SW-4 Area** – Some gravel cover has been replaced with concrete along the western edge of the area (Appendix A; Photos 2, 4).
- **SW-5 Area** – The gravel cover appeared adequate; the underlying geotextile fabric was not exposed in any area (Appendix A; Photos 11, 13, 14, 15, and 16).
- **SW-6 Area** – The gravel cover appeared adequate; the underlying geotextile fabric was not exposed in any area (Appendix A; Photo 23).

No visual evidence of differential settling or vertical displacement was observed. Overall, the gravel cover was found to be in good condition and functioning properly with no apparent potential for exposure of the underlying subgrade. CDIM recommends that LRTC continue to regularly inspect the gravel cover and perform maintenance as detailed in Section 6.

4.1 Triennial Upland Cap Survey

In its Third-Five Year Review, the EPA recommended that the upland cap be periodically surveyed to monitor for differential settlement that could impact cap integrity (EPA, 2011). The baseline triennial survey was completed in May 2014 and included in the 2013-2014 Annual Report (Weiss, 2014).

Dillon & Murphy of Lodi, California performed the second triennial survey on May 9, 2017. The survey plat provided in Appendix D presents the 2017 point elevations and the baseline elevations for comparison. Elevations were within 0.01 inches at all survey locations, indicating no differential settlement has occurred in the previous three years. Triennial surveys will remain a part of the Site O&M program, with the next survey to occur during the 2019-2020 reporting period.

5 PROPOSED SITE WORK FOR 2017-2018

During the 2017-2018 reporting year, O&M activities will continue as follows:

- Storm water discharge samples will be collected from the TS-2 treatment system effluent (combined SW-3 through SW-7) discharge location. TS-2 influent samples will also be collected to evaluate system effectiveness.
- An annual inspection of the concrete cap and gravel cover in the upland cap area will be performed in the early summer of 2018.
- Regular inspections of the upland capping system, including the drainage system, will continue as part of the SWPPP (CDIM, 2016b) compliance activities and daily operations.
- As needed, filling of significant cracks and replacement of deteriorated sections of concrete in the upland capping system.

Proposed site work under the O&M Plan for 2017-2018 is presented in Table 3.

Any repairs to the cap, if required, will be documented and reported in a memorandum to the EPA and the California Department of Toxic Substances Control.

6 CONCLUSIONS AND RECOMMENDATIONS

The annual upland capping system inspection found that the surface cap is in overall good condition and effectively functions to prevent erosion of the underlying soil. Storm water sampling results from the upland cap area indicate that treatment system TS-2 is effective in reducing the discharge of pesticides.

CDIM recommends continuing the following maintenance and monitoring activities:

- Monitor gravel cover areas of SW-5 and SW-6;
- Monitor deteriorated concrete in the southern portion of the eastern swale of the Main Terminal at SW-5.
- As needed, fill significant cracks and replace deteriorated sections of concrete in the upland capping system;
- Implement regular inspections and BMPs identified in the LRT SWPPP (CDIM, 2016b); and,
- Continue to monitor storm water for pesticides as described herein.

7 REFERENCES

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TABLES

Table 1. 2016-2017 Storm Water Sample Analytical, Pesticides, Levin Richmond Terminal Corporation

Discharge Location	Notes	Analytical results[a]																												
		2,4'-DDD pg/L	4,4'-DDD pg/L	2,4'-DDE pg/L	4,4'-DDE pg/L	2,4'-DDT pg/L	4,4'-DDT pg/L	Total DDT pg/L	Aldrin pg/L	alpha-BHC pg/L	alpha-Chlordane pg/L	beta-BHC pg/L	cis-Nonachlor pg/L	delta-BHC pg/L	Dieldrin pg/L	Endosulfan I pg/L	Endosulfan II pg/L	Endosulfan sulfate pg/L	Endrin pg/L	Endrin aldehyde pg/L	Endrin ketone pg/L	gamma-BHC (Lindane) pg/L	gamma-Chlordane pg/L	Heptachlor pg/L	Heptachlor epoxide[d] pg/L	Hexachlorobenzene pg/L	Methoxychlor pg/L	Mirex pg/L	Oxychlordane pg/L	trans-Nonachlor pg/L
INFLUENT																														
TS2-I[b]																														
10/14/2016		**3,250**	**7,130**	**699**	**8,720**	**3,070**	**12,600**	**35,469**	<29.1	**93.7 J**	**802**	<57.5	<226	<38.5	**3,960 B**	<141	<332	<740	**1,070**	<1,050	<16,200**	**90.3**	**875**	**167 J**	**96.0 J**	**1,310 B**	<7,620	<136	<93.3	**345 J**
12/8/2016		**8,960**	**19,400 D**	**1,610 D**	**20,000 D**	**18,900 D**	**61,800 D**	**130,670 D**	**65.1**	**89.3***	**4,380**	<93.2**	**511**	<23.6	**7,310 D**	<127	<552	<694	**1,440**	<857*	<561	**111**	**2,970**	<90.0**	**254**	**2,650 B**	<542	<111	<87.0	**1,730**
1/3/2017		**5,440**	**13,100**	**730**	**8,930**	**9,290**	**34,400 D**	**71,890 D**	<30.6**	**75.6**	**2,920**	**66.6**	<192**	<9.02	**3,190**	<27.8	<147	<95.6	**780**	<65.7	<151	**92.0**	**1,620**	**42.8**	**961**	**292**	<364	<11.2	**69.8**	**921**
1/18/2017		**11,800**	**25,400 D**	**2,040**	**22,400**	**20,600**	**64,800 D**	**147,040 D**	**77.4**	**68.2**	**2,520**	**82.6**	<200**	<12.6	**3,810**	<47.8	<273 D	<407 D	**1,100**	<581 D	<624 D	**89.8**	**1,640**	**67.0**	**186**	**800**	<477	<59.4	<34.3	**983**
EFFLUENT																														
TS2-E[c]																														
10/14/2016		**300 J**	**485**	**46.5 J**	**471**	**175 J**	**585**	**2,063**	<37.9	<54.3**	**201 J**	**153 J**	<194	<28.5	**1,640 B**	<120	<336	<646	**531**	<337	<506	<35.1	<102	<32.8	<258	**120 J,B**	<736	<48.7	<102	<97.6
12/8/2016		**194**	**410**	**25.5 J***	**381***	**233**	**951**	**2,195**	<5.55	**75.5**	<134**	**69.2**	<52.0*	<5.59	**1,460**	<42.7	<168	<306	**470**	<220	**726**	**86.8**	<72.8**	<9.54	**181.9**	**67.1 B**	<241	<30.9	<23.8	**58.3**
1/3/2017		**378**	**770**	**27.6 J**	**207**	**307**	**767**	**2,457**	<3.83	**41.4**	**223**	**57.8**	<10.1	<5.38	**1,300**	<15.6	<40.5	<23.6	**356**	<12.8	**433**	**88.1**	<87.6**	<11.1	**804**	**27.9 J**	<32.5	<2.36	<18.3	**54.3**
1/18/2017		**409**	**700**	**24.2 J**	**191**	**266**	**619**	**2,209**	<5.49	**52.5**	**378**	**191**	<22.8	<2.89	**2,770**	<21.0	<80.4	<118	**769**	<47.5	**1,960**	**48.8**	**132**	<2.02	**1,007**	**29.1**	<16.1	<12.0	<15.3	**60.4**
Remediation Goal[e]								590							140															

Notes:

Detected concentrations of pesticides are displayed in **bold**.

* Laboratory surrogate recoveries for this analyte outside of quality control standards due to matrix interference; result may be biased.

** Not detected; reported value is estimated maximum possible concentration.

[a] Laboratory method EPA 1699.

[b] TS2-I is the combined influent from interceptors SW-3 to SW-7 and does not represent discharge. It is used to evaluate TS-2 effectiveness.

[c] TS2-E is the effluent of treatment system TS-2, which treats storm water from interceptors SW-3 to SW-7. It represents facility discharge.

[d] Reported result is sum of detected cis- and trans-heptachlor epoxide concentrations.

[e] Remediation goal from USEPA Superfund Record of Decision: United Heckathorn Co., October 1994, for surface waters in the Lauritzen, Santa Fe, and lower Richmond Inner Harbor Channels.

Acronyms/Abbreviations:

--- = not analyzed

B = compound was also detected in laboratory method blank

D = sample diluted for analysis; concentration calculated value

J = concentration reported is an estimated value

< *n* =not detected above the sample-specific estimated detection limit

pg/L = picograms per liter

USEPA = United States Environmental Protection Agency

Table 2. 2016-2017 Storm Water Sample Analytical Results, General Parameters and Metals, Levin Richmond Terminal Corporation

Discharge Location	Notes	Analytical Paramaters[a]																
		pH		O&G (HEM)		TSS		Aluminum		Copper		Iron		Lead		Zinc		
		-		mg/L		mg/L		µg/L		µg/L		µg/L		µg/L		µg/L		
INFLUENT																		
TS2-I[b]																		
10/14/2016		8.0		1.9	J	160		703		20.5		1,260		18.4		432		
12/8/2016		6.95		2.1		175		584		21.5		2,070		72.9		255		
1/3/2017		7.90		<1.0		27		293		10.9		1,050		9.12		169		
1/18/2017		7.76		1.0		131		721		13.5		1,870		89.8		250		B
EFFLUENT																		
TS2-E[c]																		
10/14/2016		8.0		<5.26		10		57	J	7.8		<100		<5.0		47		
12/8/2016		7.37		<1.0		3.8		19.5	J	12.2		74.9		4.05		118		
1/3/2017		8.04		<1.0		1.4		16.4	J	13.4		**1,800 / 1,620[d]**		5.34		119		
1/18/2017		7.55		<1.0		1.7		13.3	J	3.11		25.3	J	2.14		114		B
1/18/2017	Duplicate	7.86		<1.0		<1.0		14.6	J	3.39		26.2	J	2.29		115		B
2014 IGP Numeric Action Levels (NALs)[e]		6.0-9.0[f]		15		100		750		33.2		1,000		262		260		

Notes:

Bold values exceed 2014 IGP NALs listed at the bottom of the table.

[a] Laboratory Methods: pH by EPA 9040C; TSS by SM2540D, O&G by EPA 1664A; metals by EPA 200.7/200.8.

[b] TS2-I is the combined influent from interceptors SW-3 to SW-7 and does not represent discharge. It is used to evaluate TS-2 effectiveness.

[c] TS2-E is the effluent of treatment system TS-2, which treats storm water from interceptors SW-3 to SW-7.

[d] Sample was re-analyzed due to unexpected result in original lab report.

Acronyms/Abbreviations:

B = compounds was found in blank and sample

J = concentration reported is an estimated value

mg/L = milligrams per liter

< *n* = not detected above the reporting limit

O&G (HEM) = oil and grease hexane extractable

TSS = total suspended solids

Table 3. Proposed Site Work for 2017-2018, Levin Richmond Terminal Corporation

Aspect	Description	Anticipated Completion Date
General	Implement activities (i.e., cap maintenance, storm water monitoring, interceptor cleanout) described in the O&M Plan.[1]	Continuously
	Submit report of O&M performed for the period of July 1, 2017 to June 30, 2018.	On/around August 15, 2018
Concrete Cap	Perform 2017-2018 annual inspection of the cap under oversight of a registered engineer.	June 1, 2018
	Monitor deteriorated concrete in the southern portion of the eastern swale of the Main Terminal identified in Photos 18 and 19 (Appendix A); replace affected sections should evidence of underlying soil be observed.	Continuously
	Monitor identified cracks, seals, and joints for signs of propagation and/or degradation throughout upland capping system.	Continuously
Gravel Cover	Monitor the gravel cover throughout the Upland Area for signs of thinning or ground exposure.	Continuously
Storm Water System	Continue to treat combined storm water pumped from interceptors SW-3, SW-4, SW-5, SW-6, and SW-7 at treatment system TS-2 using flocculation, settling, and filtration methods.	Continuously

[1] *Revised Draft Operations and Maintenance Plan, Upland Capping System, Former United Heckathorn Site,* PES Environmental, Inc., March 1999.

FIGURES

CDIM ENGINEERING
45 POLK STREET, THIRD FLOOR
SAN FRANCISCO, CA 94102
WWW.CDIMENGINEERING.COM
PH: (415) 498-0535

SITE LOCATION MAP
UNITED HECKATHORN SUPERFUND SITE
UPLAND CAPPING SYSTEM
RICHMOND, CALIFORNIA

FIGURE
1

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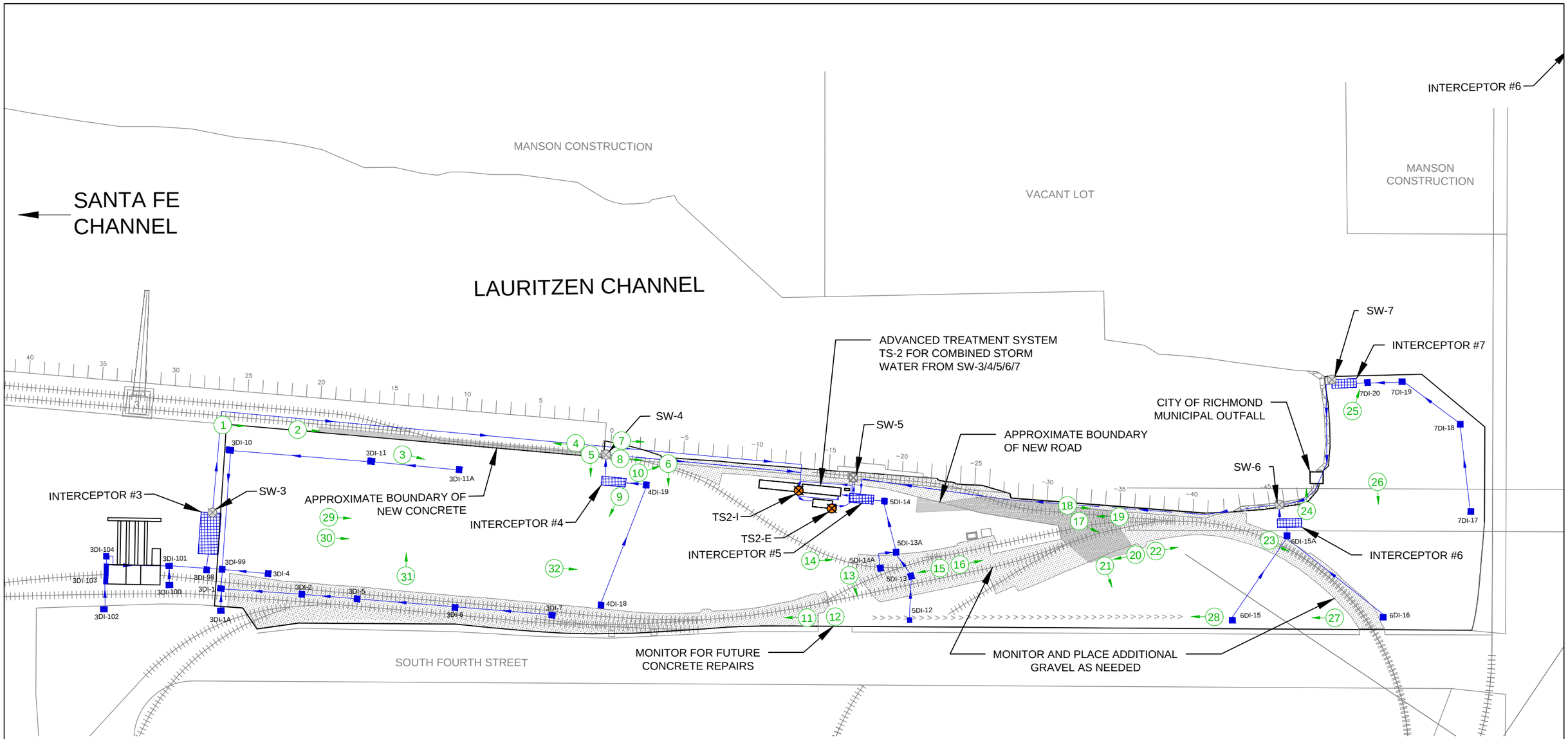
SITE LAYOUT
UNITED HECKATHORN SUPERFUND SITE
UPLAND CAPPING SYSTEM
RICHMOND, CALIFORNIA

FIGURE
2



LEGEND

- FENCELINE
- PHOTOGRAPH LOCATION (VIEW DIRECTION, NUMBER)
- CURRENT STORM WATER SAMPLING LOCATION
- HISTORICAL STORM WATER SAMPLING LOCATION
- SURFACE SWALE
- STORM DRAIN INLET
- BENT NUMBER
- GRAVEL COVER, LOCATION APPROXIMATE
- STORM WATER INTERCEPTOR
- STORM WATER PIPE
- NEW CONCRETE WORK, LOCATIONS APPROXIMATE
- UPLAND AREA BOUNDARY
- LAURITZEN CHANNEL SHORELINE
- RAIL LINE

NOTE: ALL LOCATIONS APPROXIMATE

0 100' 200'

SCALE APPROXIMATE

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45 POLK STREET, THIRD FLOOR
SAN FRANCISCO, CA 94102
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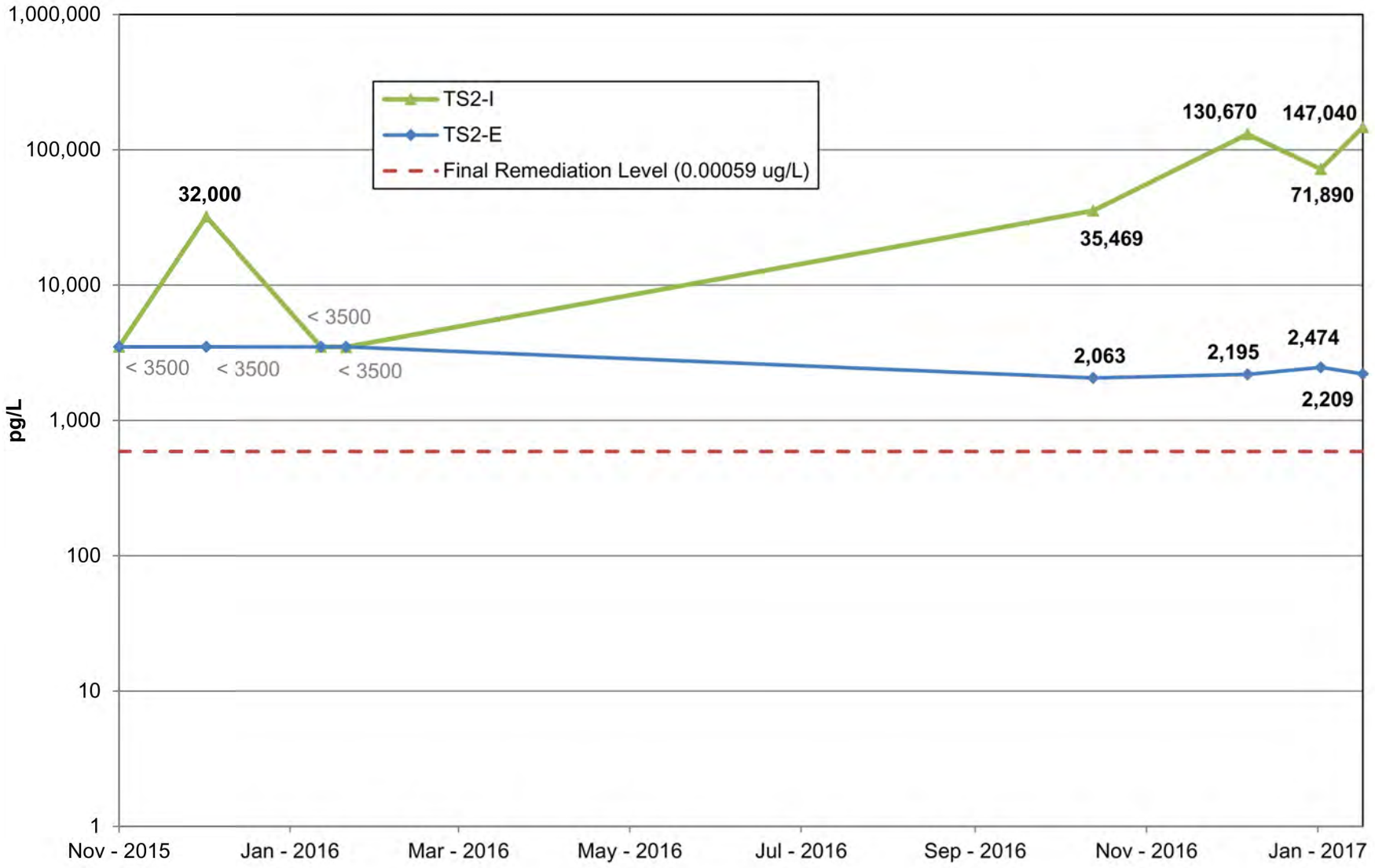
UPLAND CAPPING SYSTEM DETAILS
UNITED HECKATHORN SUPERFUND SITE
RICHMOND, CALIFORNIA

FIGURE
3



NOTE: Total DDT represents the sum of detected DDT, DDD, and DDE concentrations and/or detection limits for non-detected compounds (denoted by < n).

CDM ENGINEERING

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SAN FRANCISCO, CA 94102
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TOTAL DDT, 2015-2017
TREATMENT SYSTEM TS-2
UNITED HECKATHORN SUPERFUND SITE
UPLAND CAPPING SYSTEM
RICHMOND, CALIFORNIA

FIGURE
4

APPENDIX A

Upland Capping System Inspection Photos

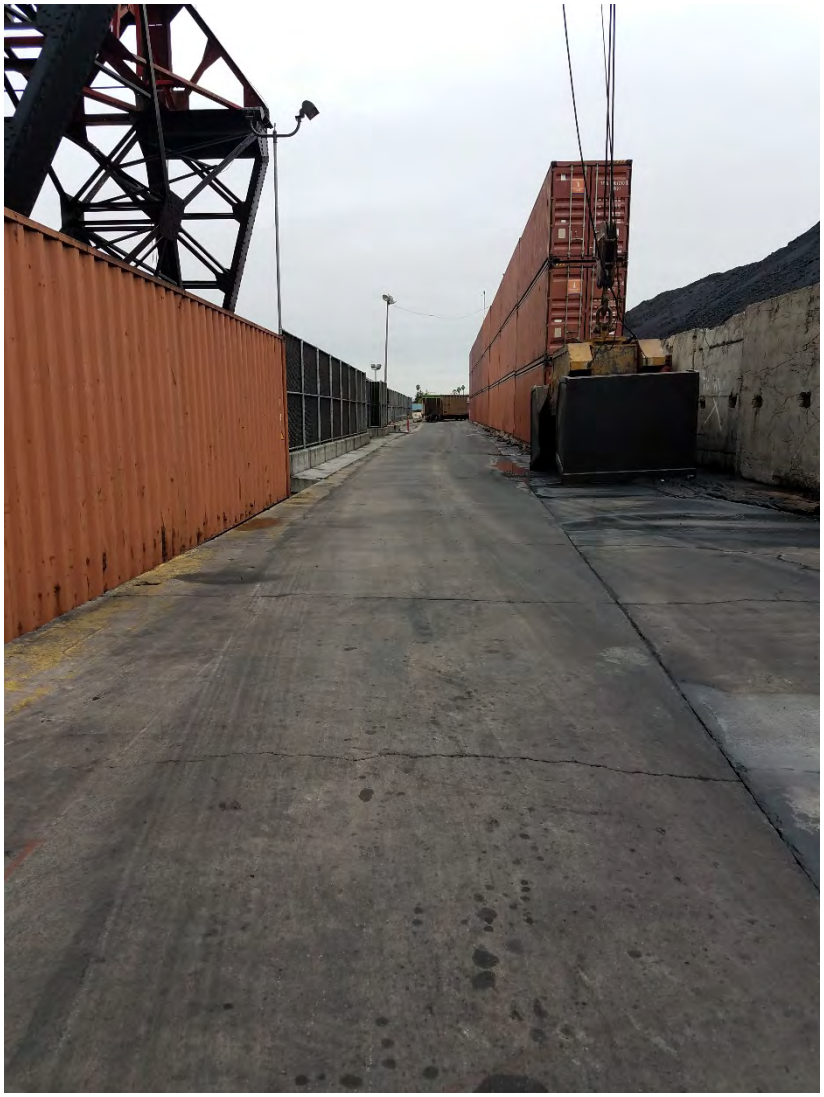

Photo 1 – Looking north along western alley of secondary storage area: new curbing and wind fence added to 2015-2016 concrete work to widen road.

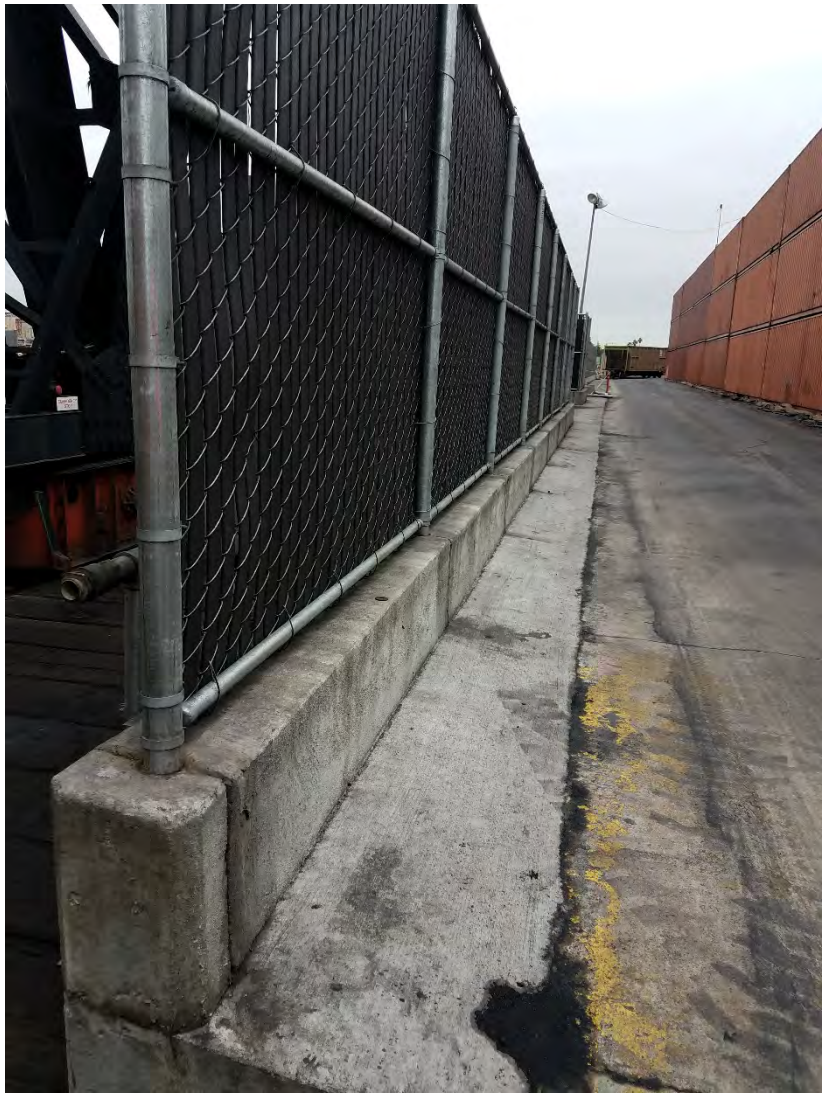

Photo 2 – Closeup view of new curbing and wind fence.

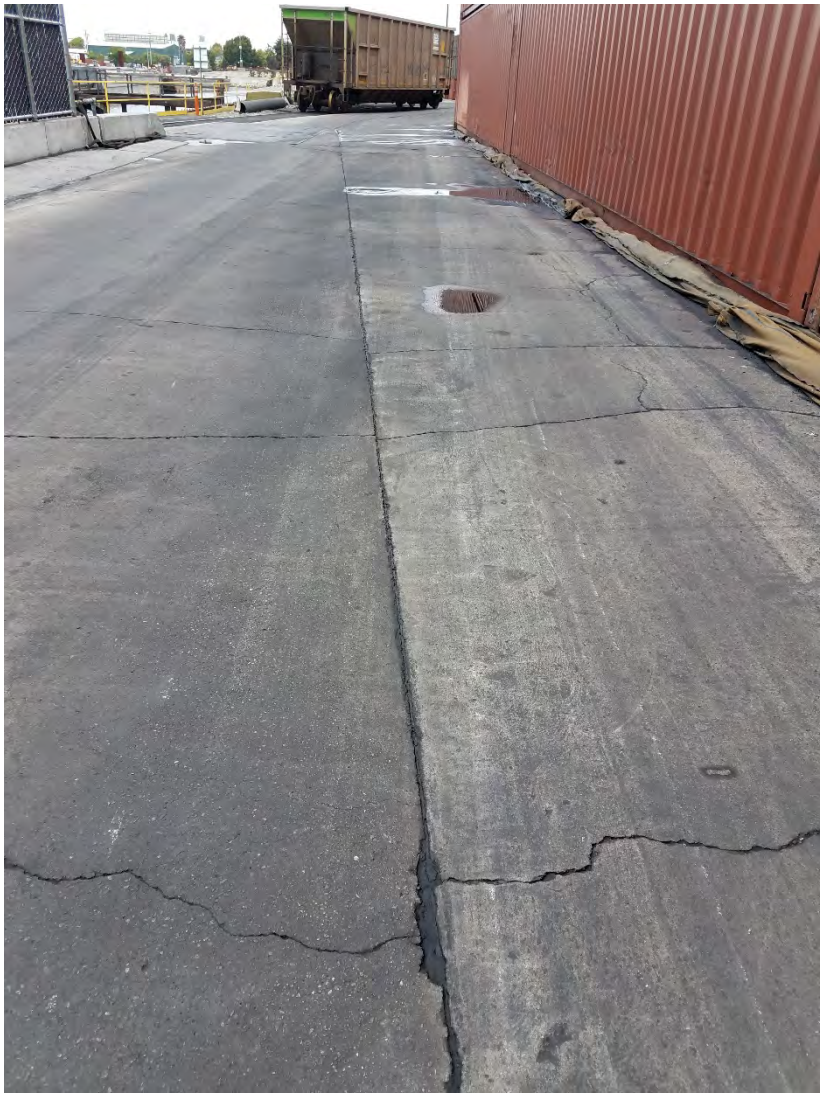

Photo 3 – Looking north toward interceptor SW-4: seams and areas of surficial cracking. No change noted from previous year.

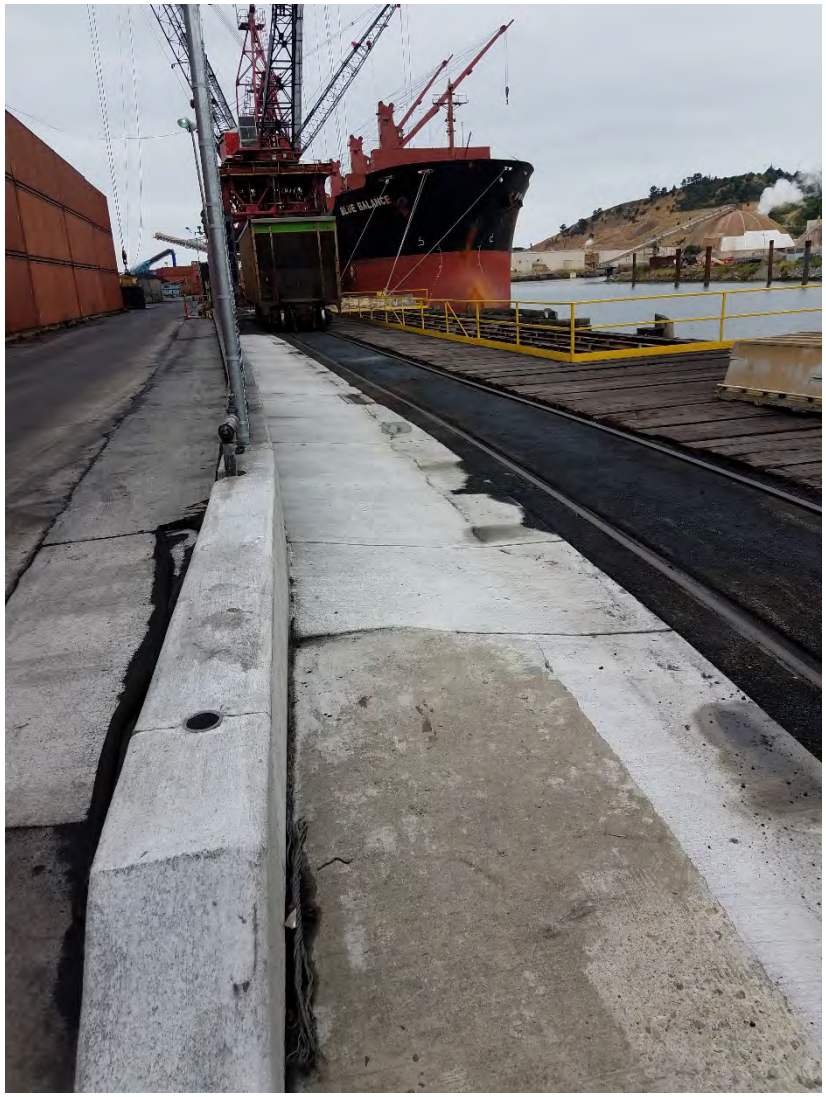

Photo 4 - Looking south: new concrete work completed during 2016-2017 reporting year.

Photo 5 – Looking east from corner of interceptor SW-4: crack extending east with sealant and concrete wearing at seams. No change noted from previous year.

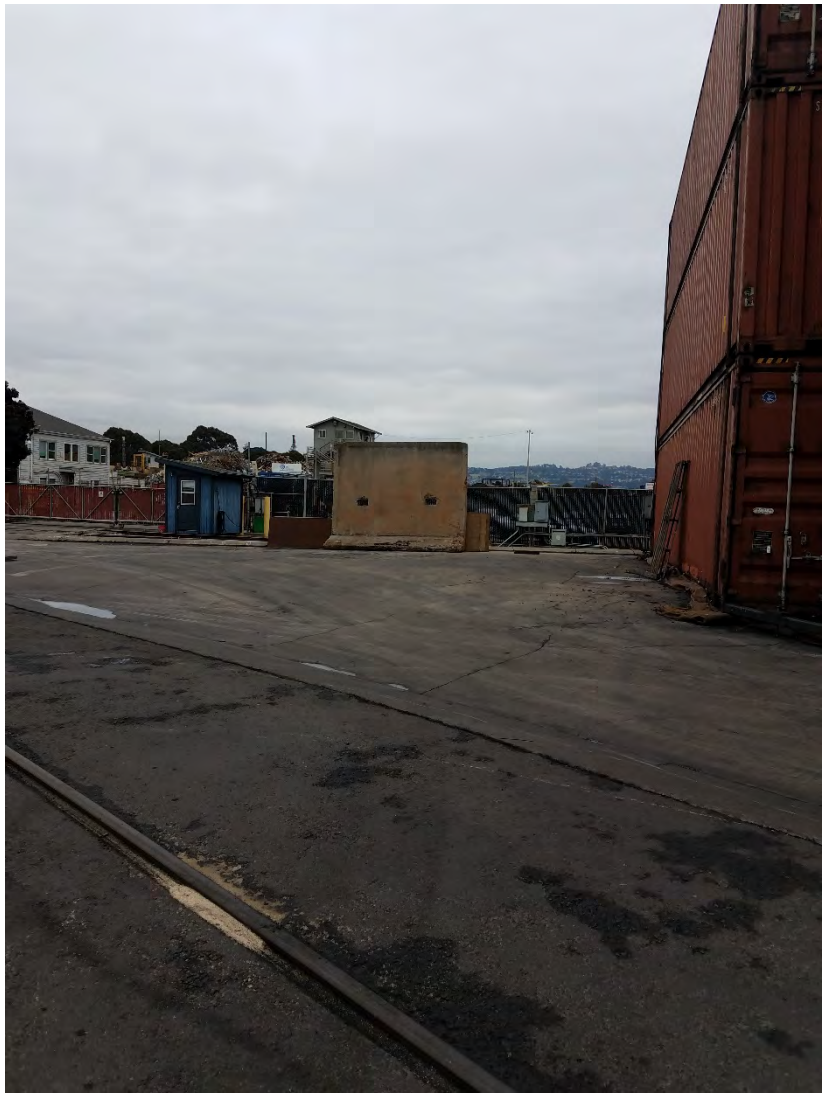

Photo 6 – Looking east: concrete seams and surficial cracks.

Photo 7 - Looking north: shoreline shotcrete placed in 2015-2016 reporting year.

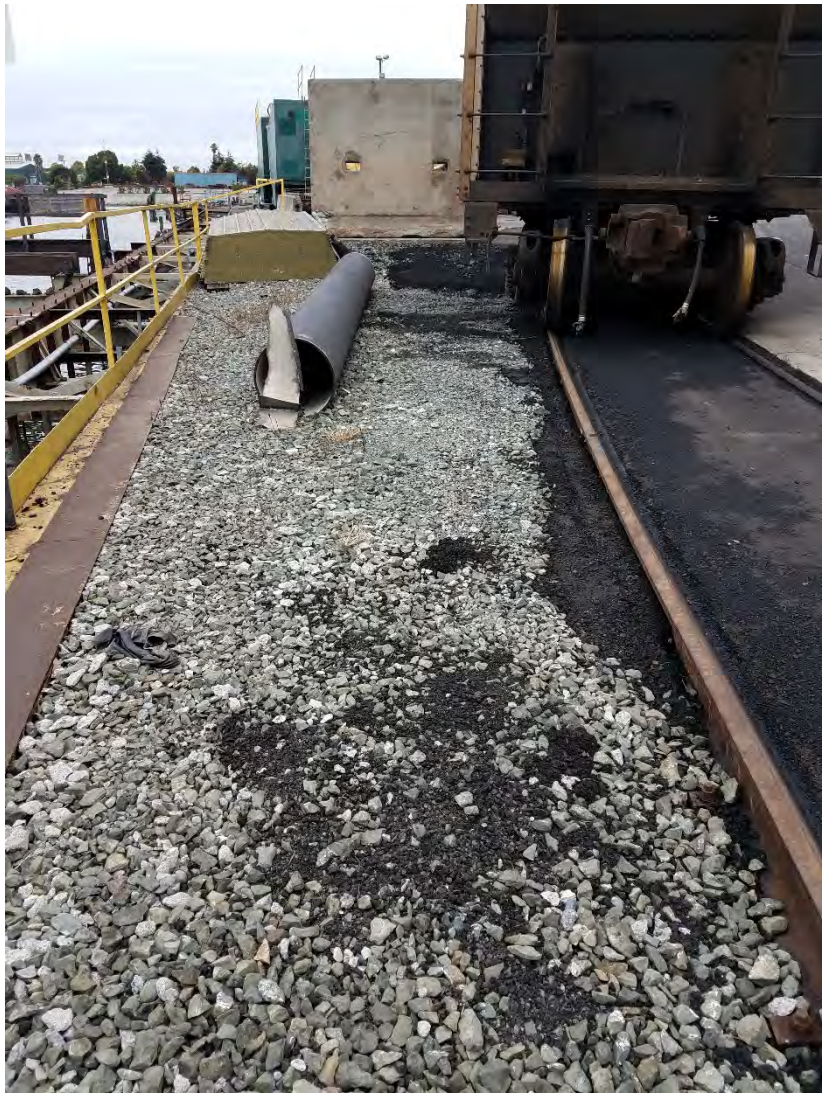

Photo 8 - Looking north: gravel cover to the west of new asphalt pavement south of treatment system TS-2 and interceptor SW-5.

Photo 9 – Looking east: surficial cracking east of interceptor SW-4.

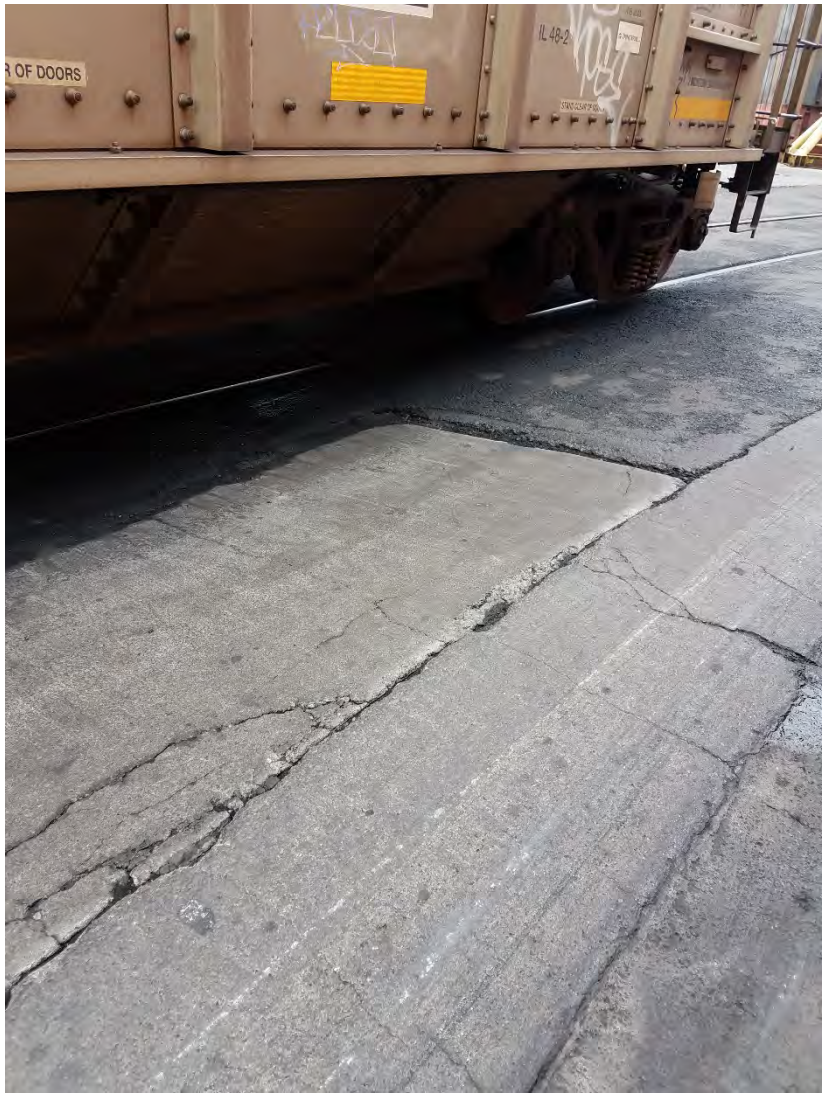

Photo 10 – Looking north: seams and surficial cracking along rail line.

Photo 11 – Looking south: gravel cover along eastern perimeter.

Photo 12 – Looking north: areas of minor concrete deterioration at the southern portion of the eastern swale. No change from previous year.

Photo 13 – Looking northeast: gravel cover along rail lines.

Photo 14 – Looking north: gravel cover along rail lines.

Photo 15 – Looking south: gravel cover between rail lines with some areas of thinning.

Photo 16 – Looking north: gravel cover with some thinning areas to the east of diesel fuel tank.

Photo 17 – Looking northeast: new asphalt across rail lines installed in 2016-2017 replaced existing gravel cover.

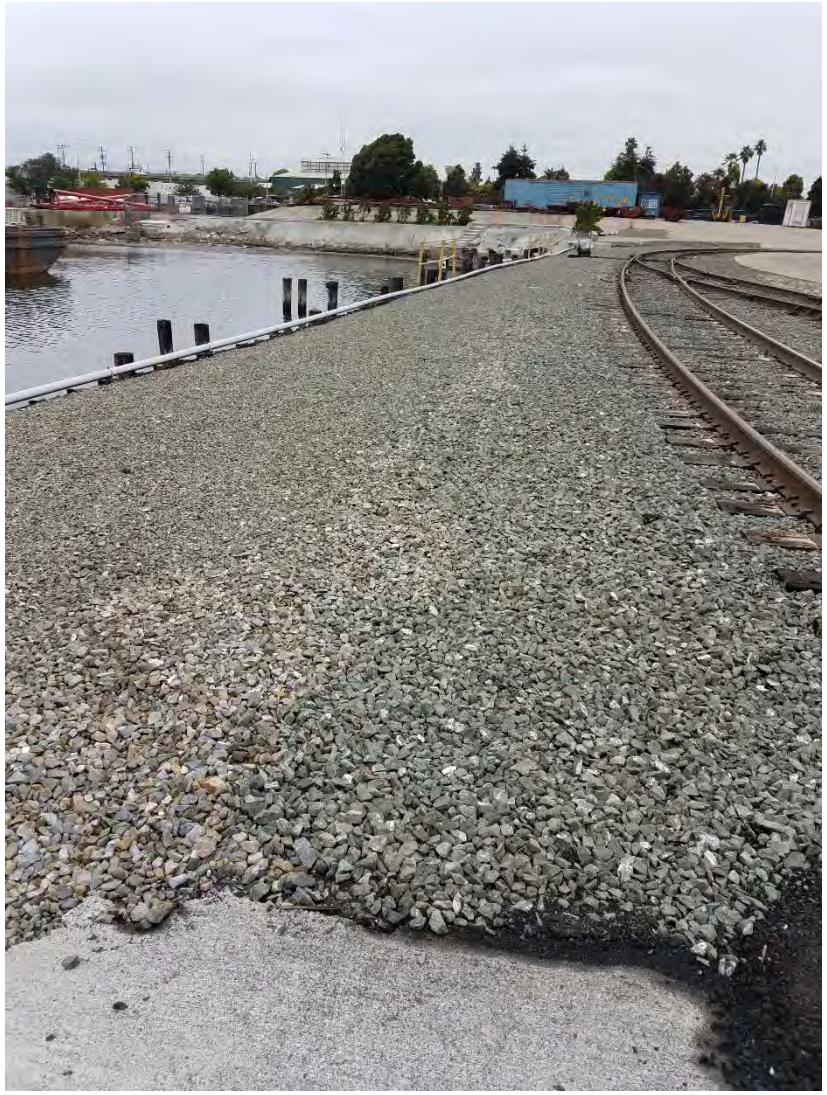

Photo 18 – Looking north: gravel cover north of new road.

Photo 19 – Looking south: new road (installed 2015-2016) and asphalt (installed 2016-2017).

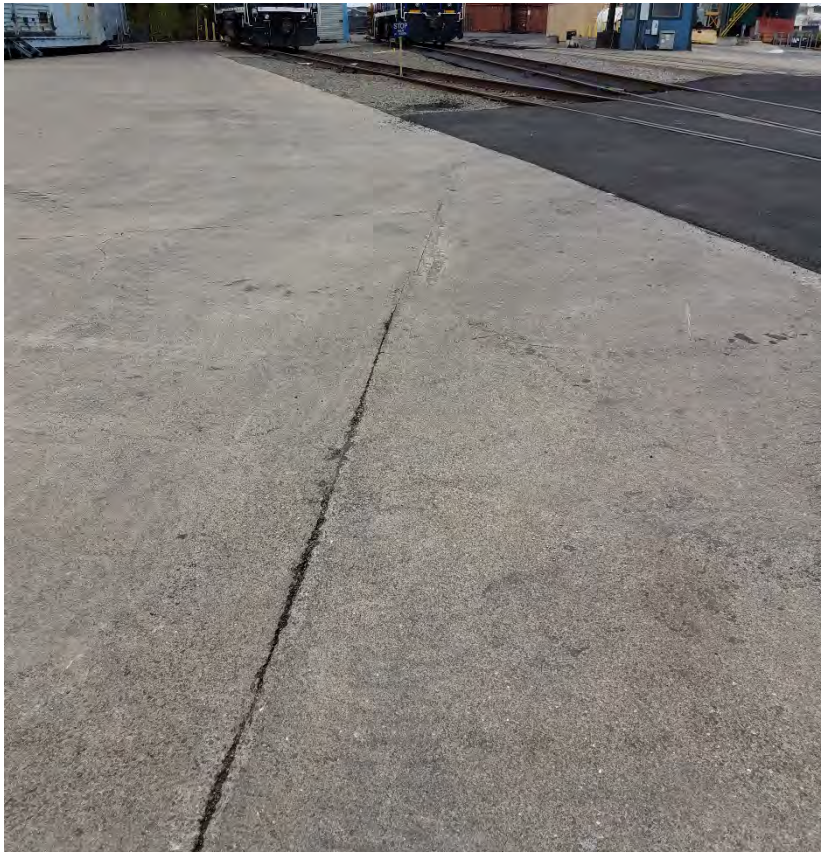

Photo 20 – Looking southeast: concrete seams with new asphalt in background.

Photo 21 – Looking east: surficial cracks east of rail lines.

Photo 22 – Looking north: cap area south of interceptor SW-6.

Photo 23 – Looking northeast toward northern gate: gravel cover area.

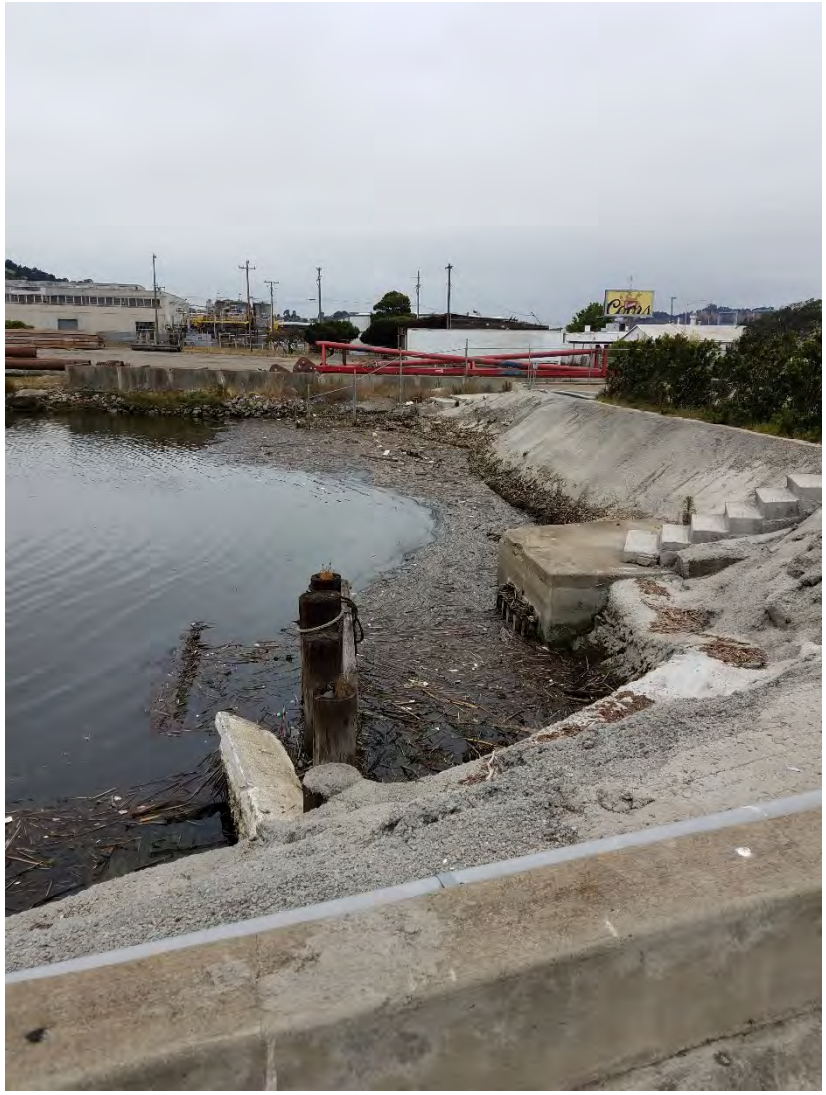

Photo 24 – Looking west toward municipal outfall: shotcrete along northern shoreline.

Photo 25 – Looking west: seams and surficial cracks east of interceptor SW-7.

Photo 26 – Looking east: seams and surficial cracks northeast of interceptor SW-6.

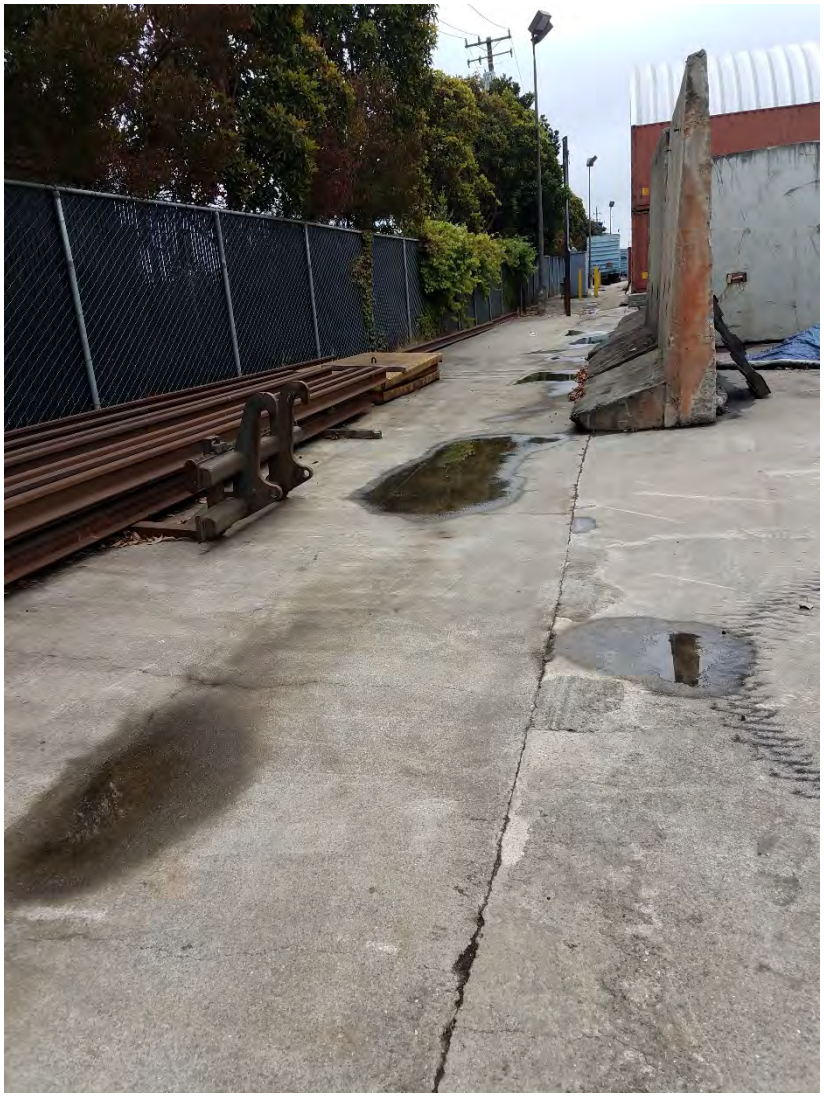

Photo 27 – Looking south: seams and surficial cracks in swale on eastern perimeter of site.

Photo 28 – Looking south: seams gravel cover in railroad maintenance area.

Photo 29 – Looking north: surficial cracks at southern end of bulk product storage area.

Photo 30 – Looking north: seam running north to south in bulk product storage area.

Photo 31 – Looking west: surficial cracking within bulk product storage area.

Photo 32 – Looking north: residual bulk product pile obscuring cap surface.

APPENDIX B

Laboratory Analytical Reports

November 09, 2016

Vista Work Order No. 1601325

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on October 18, 2016. This sample set was analyzed on a standard turn-around time, under your Project Name '101-001-LRTC, Task 1'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1601325
Case Narrative

Sample Condition on Receipt:

Two water samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1699

These samples were extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The recovery of Endrin Aldehyde was 179% in the OPR; this analyte was not detected in either of the field samples. The OPR recoveries were within the method acceptance criteria for all other analytes.

The labeled standard recoveries outside the method acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1601325-01	TS2-I-161014	EPA Method 1699	13C12-Aldrin	H	123
1601325-02	TS2-E-161014	EPA Method 1699	13C10-cis-Heptachlor Epoxide	H	151

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1601325-01	TS2-I-161014	14-Oct-16 14:20	18-Oct-16 08:58	Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L
1601325-02	TS2-E-161014	14-Oct-16 14:40	18-Oct-16 08:58	Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank — EPA Method 1699

Matrix: Aqueous
Sample Size: 0.100 L

QC Batch: B6J0134
Date Extracted: 21-Oct-2016 13:56

Lab Sample: B6J0134-BLK1
Date Analyzed: 03-Nov-16 00:45 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	51.6			J
alpha-BHC	ND	30.7		
Lindane (gamma-BHC)	ND	36.9		
beta-BHC	ND	33.9		
delta-BHC	ND	23.9		
Heptachlor	ND	8.04		
Aldrin	ND	16.0		
Oxychlordane	ND	37.9		
cis-Heptachlor Epoxide	ND	27.4		
trans-Heptachlor Epoxide	ND	69.4		
trans-Chlordane (gamma)	ND	36.8		
trans-Nonachlor	ND	33.1		
cis-Chlordane (alpha)	ND	31.8		
Endosulfan I (alpha)	ND		83.8	
2,4'-DDE	ND	30.5		
4,4'-DDE	ND	31.9		
Dieldrin	89.5			J
Endrin	ND	23.8		
cis-Nonachlor	ND	30.8		
Endosulfan II (beta)	ND	47.2		
2,4'-DDD	ND	42.5		
2,4'-DDT	ND	65.1		
4,4'-DDD	ND	50.2		
4,4'-DDT	ND	73.9		
Endosulfan Sulfate	ND	49.0		
4,4'-Methoxychlor	ND	32.7		
Mirex	ND	6.86		
Endrin Aldehyde	ND	39.9		
Endrin Ketone	ND	38.8		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	47.7	5 - 120	
IS	13C6-alpha-BHC	55.8	32 - 130	
IS	13C6-Lindane (gamma-BHC)	70.7	11 - 120	
IS	13C6-beta-BHC	80.1	32 - 130	
IS	13C6-delta-BHC	84.9	36 - 137	
IS	13C10-Heptachlor	68.8	5 - 120	
IS	13C12-Aldrin	74.8	5 - 120	
IS	13C10-Oxychlordane	87.3	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	112	27 - 137	
IS	13C10-trans-Chlordane (gamma)	91.7	21 - 132	
IS	13C10-trans-Nonachlor	94.8	14 - 136	
IS	13C9-Endosulfan I (alpha)	102	15 - 148	
IS	13C12-2,4'-DDE	102	47 - 160	
IS	13C12-4,4'-DDE	106	47 - 160	
IS	13C12-Dieldrin	96.8	40 - 151	
IS	13C12-Endrin	116	35 - 155	
IS	13C10-cis-Nonachlor	96.9	36 - 139	
IS	13C9-Endosulfan II (beta)	93.9	5 - 122	
IS	13C12-2,4'-DDD	106	5 - 199	
IS	13C12-2,4'-DDT	112	5 - 199	
IS	13C12-4,4'-DDD	104	5 - 120	
IS	13C12-4,4'-DDT	112	5 - 120	
IS	13C9-Endosulfan Sulfate	93.6	15 - 148	
IS	13C12-Methoxychlor	99.1	5 - 120	
IS	13C10-Mirex	76.3	5 - 120	
IS	13C12-Endrin Aldehyde	64.1	15 - 148	
IS	13C12-Endrin Ketone	99.1	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous
Sample Size: 0.100 L

QC Batch: B6J0134
Date Extracted: 21-Oct-2016 13:56

Lab Sample: B6J0134-BS1
Date Analyzed: 02-Nov-16 22:17 Column: ZB-50

Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits
Hexachlorobenzene	10100	10000	101	50 - 120
alpha-BHC	9350	10000	93.5	50 - 120
Lindane (gamma-BHC)	9030	10000	90.3	50 - 120
beta-BHC	9080	10000	90.8	50 - 120
delta-BHC	7900	10000	79.0	50 - 120
Heptachlor	9150	10000	91.5	50 - 120
Aldrin	9410	10000	94.1	50 - 120
Oxychlordane	9670	10000	96.7	50 - 120
cis-Heptachlor Epoxide	9000	10000	90.0	50 - 120
trans-Heptachlor Epoxide	8750	10000	87.5	50 - 120
trans-Chlordane (gamma)	9260	10000	92.6	50 - 120
trans-Nonachlor	9980	10000	99.8	50 - 120
cis-Chlordane (alpha)	10300	10000	103	50 - 120
Endosulfan I (alpha)	9360	10000	93.6	50 - 120
2,4'-DDE	9590	10000	95.9	24 - 123
4,4'-DDE	8610	10000	86.1	50 - 120
Dieldrin	9700	10000	97.0	50 - 120
Endrin	8930	10000	89.3	50 - 120
cis-Nonachlor	10100	10000	101	50 - 120
Endosulfan II (beta)	10100	10000	101	5 - 200
2,4'-DDD	9580	10000	95.8	50 - 120
2,4'-DDT	9650	10000	96.5	50 - 120
4,4'-DDD	9210	10000	92.1	42 - 120
4,4'-DDT	8990	10000	89.9	50 - 120
Endosulfan Sulfate	9050	10000	90.5	50 - 120
4,4'-Methoxychlor	9200	10000	92.0	50 - 120
Mirex	9320	10000	93.2	50 - 120
Endrin Aldehyde	17900	10000	179	50 - 134
Endrin Ketone	12000	10000	120	50 - 134

	Labeled Standard	%R	LCL-UCL
IS	13C6-Hexachlorobenzene	70.5	5 - 120
IS	13C6-alpha-BHC	80.8	17 - 141
IS	13C6-Lindane (gamma-BHC)	85.3	5 - 124
IS	13C6-beta-BHC	83.5	17 - 141
IS	13C6-delta-BHC	88.8	16 - 150
IS	13C10-Heptachlor	89.0	5 - 128
IS	13C12-Aldrin	78.2	5 - 126
IS	13C10-Oxychlordane	91.3	5 - 144
IS	13C10-cis-Heptachlor Epoxide	97.8	8 - 146
IS	13C10-trans-Chlordane (gamma)	89.4	15 - 144
IS	13C10-trans-Nonachlor	86.2	13 - 149
IS	13C9-Endosulfan I (alpha)	80.6	5 - 144
IS	13C12-2,4'-DDE	98.8	26 - 169
IS	13C12-4,4'-DDE	102	26 - 169
IS	13C12-Dieldrin	67.8	19 - 161
IS	13C12-Endrin	66.0	20 - 157
IS	13C10-cis-Nonachlor	90.0	17 - 154
IS	13C9-Endosulfan II (beta)	31.4	5 - 120
IS	13C12-2,4'-DDD	102	14 - 200
IS	13C12-2,4'-DDT	109	14 - 200
IS	13C12-4,4'-DDD	102	14 - 200
IS	13C12-4,4'-DDT	109	13 - 200
IS	13C9-Endosulfan Sulfate	27.9	5 - 144
IS	13C12-Methoxychlor	52.2	8 - 200
IS	13C10-Mirex	78.9	5 - 138
IS	13C12-Endrin Aldehyde	8.10	5 - 144
IS	13C12-Endrin Ketone	19.4	5 - 144

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-I-161014

EPA Method 1699

Client Data
Name: CDIM Engineering
Project: 101-001-LRTC, Task 1
Date Collected: 14-Oct-2016 14:20

Sample Data
Matrix: Water
Sample Size: 0.100 L

Laboratory Data
Lab Sample: 1601325-01 Date Received: 18-Oct-2016 8:58
QC Batch: B6J0134 Date Extracted: 21-Oct-2016 13:56
Date Analyzed: 03-Nov-16 10:42 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	1310			B
alpha-BHC	93.7			J
Lindane (gamma-BHC)	90.3			J
beta-BHC	ND	57.5		
delta-BHC	ND	38.5		
Heptachlor	167			J
Aldrin	ND	29.1		
Oxychlordane	ND	93.3		
cis-Heptachlor Epoxide	96.0			J
trans-Heptachlor Epoxide	ND	208		
trans-Chlordane (gamma)	875			
trans-Nonachlor	345			J
cis-Chlordane (alpha)	802			
Endosulfan I (alpha)	ND	141		
2,4'-DDE	699			
4,4'-DDE	8720			
Dieldrin	3960			B
Endrin	1070			
cis-Nonachlor	ND	226		
Endosulfan II (beta)	ND	332		
2,4'-DDD	3250			
2,4'-DDT	3070			
4,4'-DDD	7130			
4,4'-DDT	12600			
Endosulfan Sulfate	ND	740		
4,4'-Methoxychlor	ND	7620		
Mirex	ND	136		
Endrin Aldehyde	ND	1050		
Endrin Ketone	ND		16200	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	79.4	5 - 120	
IS	13C6-alpha-BHC	78.1	32 - 130	
IS	13C6-Lindane (gamma-BHC)	84.2	11 - 120	
IS	13C6-beta-BHC	61.9	32 - 130	
IS	13C6-delta-BHC	70.5	36 - 137	
IS	13C10-Heptachlor	81.6	5 - 120	
IS	13C12-Aldrin	123	5 - 120	H
IS	13C10-Oxychlordane	64.6	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	99.2	27 - 137	
IS	13C10-trans-Chlordane (gamma)	61.8	21 - 132	
IS	13C10-trans-Nonachlor	82.2	14 - 136	
IS	13C9-Endosulfan I (alpha)	104	15 - 148	
IS	13C12-2,4'-DDE	88.0	47 - 160	
IS	13C12-4,4'-DDE	77.2	47 - 160	
IS	13C12-Dieldrin	68.5	40 - 151	
IS	13C12-Endrin	63.9	35 - 155	
IS	13C10-cis-Nonachlor	45.8	36 - 139	
IS	13C9-Endosulfan II (beta)	44.4	5 - 122	
IS	13C12-2,4'-DDD	65.4	5 - 199	
IS	13C12-2,4'-DDT	56.4	5 - 199	
IS	13C12-4,4'-DDD	49.4	5 - 120	
IS	13C12-4,4'-DDT	30.3	5 - 120	
IS	13C9-Endosulfan Sulfate	30.2	15 - 148	
IS	13C12-Methoxychlor	22.7	5 - 120	
IS	13C10-Mirex	25.0	5 - 120	
IS	13C12-Endrin Aldehyde	25.0	15 - 148	
IS	13C12-Endrin Ketone	24.6	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-E-161014

EPA Method 1699

Client Data
Name: CDIM Engineering
Project: 101-001-LRTC, Task 1
Date Collected: 14-Oct-2016 14:40

Sample Data
Matrix: Water
Sample Size: 0.100 L

Laboratory Data
Lab Sample: 1601325-02 Date Received: 18-Oct-2016 8:58
QC Batch: B6J0134 Date Extracted: 21-Oct-2016 13:56
Date Analyzed: 03-Nov-16 11:31 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	120			J, B
alpha-BHC	ND		54.3	
Lindane (gamma-BHC)	ND	35.1		
beta-BHC	153			J
delta-BHC	ND	28.5		
Heptachlor	ND	32.8		
Aldrin	ND	37.9		
Oxychlordane	ND	102		
cis-Heptachlor Epoxide	ND	73.1		
trans-Heptachlor Epoxide	ND	185		
trans-Chlordane (gamma)	ND	102		
trans-Nonachlor	ND	97.6		
cis-Chlordane (alpha)	201			J
Endosulfan I (alpha)	ND	120		
2,4'-DDE	46.5			J
4,4'-DDE	471			
Dieldrin	1640			B
Endrin	531			
cis-Nonachlor	ND	194		
Endosulfan II (beta)	ND	336		
2,4'-DDD	300			J
2,4'-DDT	175			J
4,4'-DDD	485			
4,4'-DDT	585			
Endosulfan Sulfate	ND	646		
4,4'-Methoxychlor	ND	736		
Mirex	ND	48.7		
Endrin Aldehyde	ND	337		
Endrin Ketone	ND	506		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	66.1	5 - 120	
IS	13C6-alpha-BHC	68.2	32 - 130	
IS	13C6-Lindane (gamma-BHC)	79.4	11 - 120	
IS	13C6-beta-BHC	90.4	32 - 130	
IS	13C6-delta-BHC	89.4	36 - 137	
IS	13C10-Heptachlor	67.2	5 - 120	
IS	13C12-Aldrin	116	5 - 120	
IS	13C10-Oxychlordane	60.5	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	151	27 - 137	H
IS	13C10-trans-Chlordane (gamma)	115	21 - 132	
IS	13C10-trans-Nonachlor	119	14 - 136	
IS	13C9-Endosulfan I (alpha)	145	15 - 148	
IS	13C12-2,4'-DDE	132	47 - 160	
IS	13C12-4,4'-DDE	123	47 - 160	
IS	13C12-Dieldrin	95.7	40 - 151	
IS	13C12-Endrin	105	35 - 155	
IS	13C10-cis-Nonachlor	78.1	36 - 139	
IS	13C9-Endosulfan II (beta)	82.5	5 - 122	
IS	13C12-2,4'-DDD	101	5 - 199	
IS	13C12-2,4'-DDT	85.0	5 - 199	
IS	13C12-4,4'-DDD	85.8	5 - 120	
IS	13C12-4,4'-DDT	62.8	5 - 120	
IS	13C9-Endosulfan Sulfate	73.4	15 - 148	
IS	13C12-Methoxychlor	39.6	5 - 120	
IS	13C10-Mirex	44.8	5 - 120	
IS	13C12-Endrin Aldehyde	52.2	15 - 148	
IS	13C12-Endrin Ketone	53.3	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank.**
D	**Dilution**
E	**The associated compound concentration exceeded the calibration range of the instrument.**
H	**Recovery and/or RPD was outside laboratory acceptance limits.**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ.**
*****	**See Cover Letter**
Conc.	**Concentration**
NA	**Not applicable**
ND	**Not Detected**
TEQ	**Toxic Equivalency**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2014022
Nevada Division of Environmental Protection	CA004132015-1
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-004
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

1601325

5.3°C

Chain of Custody Record

Vista Analytical
1104 Windfield Way
El Dorado Hills, CA 95762
Phone: (916) 673-1520

Please send analytic results, electronic deliverables and the original chain-of-custody form to:
sab@cdimengineering.com
mec@cdimengineering.com

INSTRUCTIONS FOR LAB PERSONNEL:
GeoTracker EDF required? o Yes x No
Equis 4-file EDWEDD required? x Yes □ No
Specify analytic/prep method and detection limit in report.
Notify us of any anomalous peaks in GC or other scans.
Call immediately with any questions or problems.

Client Contact	Project Manager: Scott Bourne	Protocol ID/path:	COC Number:
CDIM ENGINEERING	Project ID: 101-001-LRTC, Task 1		
45 POLK STREET, 3RD FLOOR	Sampled by: MEC		Page 1 of 1
SAN FRANCISCO, CA	Sample date(s): 10/14/16		
(415) 498-0535 PHONE	Analysis Turnaround Time:		SDG number:
	Standard		
Job Name: LRTC Annual Storm Water Sampling	(Specify Days or Hours)		
Address: Levin Richmond Terminal, 402 Wright Avenue, Richmond, CA 94804			

Lab ID	Sample Identification	Sample Date	Sample Time	Sample Matrix	# of Cont.	Analyte (Method ID) Pesticides (EPA 1699)	Sample Specific Notes:
	TS2-I-161014	10/14/16	1420	W	3	X	
	TS2-E-161014	10/14/16	1440	W	3	X	
				Field Filtered (X):			
Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____						1	

Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Please use agreed upon analyte list for EPA 1699.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
M Cunningham CDIM X	CDIM ENG	10/14/16 1830	M Cunningham ●	CDIM ENG	10/17/16 0630
Relinquished by: M Cunningham X	Company: CDIM	Date/Time: 10/17/16 0920	Received by: Beth Bruett ○	Company: VAL	Date/Time: 10/18/16 0920
Relinquished by:	Company:	Date/Time:	Received by: ○	Company:	Date/Time:

x = Samples released to a secured, locked area.

● = Samples received from a secured, locked area

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1601325 **TAT** Std

Samples Arrival:	**Date/Time** 10/18/16 0858	**Initials:** JBB	**Location:** WR-2 **Shelf/Rack:** NA
Logged In:	**Date/Time** 10/18/16 1332	**Initials:** JBB	**Location:** WR-2 **Shelf/Rack:** B5

Delivered By:	(FedEx)	UPS	On Trac	DHL	Hand Delivered	Other
Preservation:	(Ice)	Blue Ice		Dry Ice	None	

Temp °C: 5.6	(uncorrected)	**Time:** 0919	**Thermometer ID:** IR-1
Temp °C: 5.3	(corrected)	**Probe used: Yes☐ No☑**	

	YES	NO	NA
Adequate Sample Volume Received? A,B,C	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Shipping Documentation Present?	✓		
Airbill / Trk # 7843 6886 4525	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Preservation Documented:	$Na_2S_2O_3$	Trizma			Yes	No	(NA)
Shipping Container	Vista	(Client)	Retain	(Return)		Dispose	

Comments:

January 03, 2017

Vista Work Order No. 1601548

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 09, 2016. This sample set was analyzed on a standard turn-around time, under your Project Name '101-001-LRTC, Task 1'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Karen Lopez for

Martha Maier
Laboratory Director

Vista Work Order No. 1601548
Case Narrative

Sample Condition on Receipt:

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1699

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. The recovery of 13C12-Methoxychlor and 13C10-Mirex were outside of the method acceptance criteria in the Method Blank and OPR; these analytes were not detected in the field sample. All other OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1601548-01	TS2-E-161208	EPA Method 1699	13C12-2,4'-DDE	H	43.4
1601548-01	TS2-E-161208	EPA Method 1699	13C12-4,4'-DDE	H	32.4
1601548-01	TS2-E-161208	EPA Method 1699	13C10-cis-Nonachlor	H	23.0
B6L0072-BLK1	B6L0072-BLK1	EPA Method 1699	13C12-Methoxychlor	H	176
B6L0072-BLK1	B6L0072-BLK1	EPA Method 1699	13C10-Mirex	H	142
B6L0072-BS1	B6L0072-BS1	EPA Method 1699	13C12-Methoxychlor	H	204
B6L0072-BS1	B6L0072-BS1	EPA Method 1699	13C10-Mirex	H	180
B6L0072-BS1	B6L0072-BS1	EPA Method 1699	13C12-Endrin Ketone	H	151

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1601548-01	TS2-E-161208	08-Dec-16 09:05	09-Dec-16 09:37	Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank

EPA Method 1699

Matrix: Aqueous
Sample Size: 1.00 L

QC Batch: B6L0072
Date Extracted: 14-Dec-2016 7:30

Lab Sample: B6L0072-BLK1
Date Analyzed: 28-Dec-16 14:38 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	3.25			J
alpha-BHC	ND	5.34		
Lindane (gamma-BHC)	ND	9.07		
beta-BHC	ND	9.60		
delta-BHC	ND	6.38		
Heptachlor	ND	5.66		
Aldrin	ND	3.24		
Oxychlordane	ND	11.5		
cis-Heptachlor Epoxide	ND	9.05		
trans-Heptachlor Epoxide	ND	31.4		
trans-Chlordane (gamma)	ND	10.7		
trans-Nonachlor	ND	8.64		
cis-Chlordane (alpha)	ND	8.41		
Endosulfan I (alpha)	ND	12.8		
2,4'-DDE	ND	2.51		
4,4'-DDE	ND	2.53		
Dieldrin	ND	3.19		
Endrin	ND	13.1		
cis-Nonachlor	ND	6.27		
Endosulfan II (beta)	ND	27.7		
2,4'-DDD	ND	3.69		
2,4'-DDT	ND	8.58		
4,4'-DDD	ND	3.76		
4,4'-DDT	ND	9.06		
Endosulfan Sulfate	ND	20.6		
4,4'-Methoxychlor	ND	4.78		
Mirex	ND	1.78		
Endrin Aldehyde	ND	45.5		
Endrin Ketone	ND	20.9		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	66.3	5 - 120	
IS	13C6-alpha-BHC	93.7	32 - 130	
IS	13C6-Lindane (gamma-BHC)	91.7	11 - 120	
IS	13C6-beta-BHC	90.3	32 - 130	
IS	13C6-delta-BHC	89.6	36 - 137	
IS	13C10-Heptachlor	71.4	5 - 120	
IS	13C12-Aldrin	58.1	5 - 120	
IS	13C10-Oxychlordane	58.7	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	57.1	27 - 137	
IS	13C10-trans-Chlordane (gamma)	69.8	21 - 132	
IS	13C10-trans-Nonachlor	68.8	14 - 136	
IS	13C9-Endosulfan I (alpha)	67.8	15 - 148	
IS	13C12-2,4'-DDE	68.8	47 - 160	
IS	13C12-4,4'-DDE	71.8	47 - 160	
IS	13C12-Dieldrin	74.6	40 - 151	
IS	13C12-Endrin	59.0	35 - 155	
IS	13C10-cis-Nonachlor	62.9	36 - 139	
IS	13C9-Endosulfan II (beta)	50.1	5 - 122	
IS	13C12-2,4'-DDD	100	5 - 199	
IS	13C12-2,4'-DDT	104	5 - 199	
IS	13C12-4,4'-DDD	99.2	5 - 120	
IS	13C12-4,4'-DDT	100	5 - 120	
IS	13C9-Endosulfan Sulfate	46.0	15 - 148	
IS	13C12-Methoxychlor	176	5 - 120	H
IS	13C10-Mirex	142	5 - 120	H
IS	13C12-Endrin Aldehyde	26.5	15 - 148	
IS	13C12-Endrin Ketone	133	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous
Sample Size: 1.00 L

QC Batch: B6L0072
Date Extracted: 14-Dec-2016 7:30

Lab Sample: B6L0072-BS1
Date Analyzed: 28-Dec-16 11:20 Column: ZB-50

Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits
Hexachlorobenzene	1050	1000	105	50 - 120
alpha-BHC	1070	1000	107	50 - 120
Lindane (gamma-BHC)	1030	1000	103	50 - 120
beta-BHC	1060	1000	106	50 - 120
delta-BHC	1040	1000	104	50 - 120
Heptachlor	967	1000	96.7	50 - 120
Aldrin	1010	1000	101	50 - 120
Oxychlordane	893	1000	89.3	50 - 120
cis-Heptachlor Epoxide	1030	1000	103	50 - 120
trans-Heptachlor Epoxide	1010	1000	101	50 - 120
trans-Chlordane (gamma)	1020	1000	102	50 - 120
trans-Nonachlor	947	1000	94.7	50 - 120
cis-Chlordane (alpha)	976	1000	97.6	50 - 120
Endosulfan I (alpha)	955	1000	95.5	50 - 120
2,4'-DDE	1070	1000	107	24 - 123
4,4'-DDE	995	1000	99.5	50 - 120
Dieldrin	1040	1000	104	50 - 120
Endrin	1080	1000	108	50 - 120
cis-Nonachlor	1110	1000	111	50 - 120
Endosulfan II (beta)	991	1000	99.1	5 - 200
2,4'-DDD	1130	1000	113	50 - 120
2,4'-DDT	1110	1000	111	50 - 120
4,4'-DDD	1070	1000	107	42 - 120
4,4'-DDT	1130	1000	113	50 - 120
Endosulfan Sulfate	971	1000	97.1	50 - 120
4,4'-Methoxychlor	1020	1000	102	50 - 120
Mirex	1020	1000	102	50 - 120
Endrin Aldehyde	1270	1000	127	50 - 134
Endrin Ketone	955	1000	95.5	50 - 134

	Labeled Standard	%R	LCL-UCL
IS	13C6-Hexachlorobenzene	79.1	5 - 120
IS	13C6-alpha-BHC	124	17 - 141
IS	13C6-Lindane (gamma-BHC)	118	5 - 124
IS	13C6-beta-BHC	107	17 - 141
IS	13C6-delta-BHC	108	16 - 150
IS	13C10-Heptachlor	88.6	5 - 128
IS	13C12-Aldrin	63.3	5 - 126
IS	13C10-Oxychlordane	71.0	5 - 144
IS	13C10-cis-Heptachlor Epoxide	58.0	8 - 146
IS	13C10-trans-Chlordane (gamma)	81.2	15 - 144
IS	13C10-trans-Nonachlor	86.6	13 - 149
IS	13C9-Endosulfan I (alpha)	76.9	5 - 144
IS	13C12-2,4'-DDE	77.5	26 - 169
IS	13C12-4,4'-DDE	77.8	26 - 169
IS	13C12-Dieldrin	92.1	19 - 161
IS	13C12-Endrin	70.0	20 - 157
IS	13C10-cis-Nonachlor	66.6	17 - 154
IS	13C9-Endosulfan II (beta)	62.5	5 - 120
IS	13C12-2,4'-DDD	113	14 - 200
IS	13C12-2,4'-DDT	130	14 - 200
IS	13C12-4,4'-DDD	114	14 - 200
IS	13C12-4,4'-DDT	120	13 - 200
IS	13C9-Endosulfan Sulfate	55.0	5 - 144
IS	13C12-Methoxychlor	204	8 - 200
IS	13C10-Mirex	180	5 - 138
IS	13C12-Endrin Aldehyde	27.6	5 - 144
IS	13C12-Endrin Ketone	151	5 - 144

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-E-161208

EPA Method 1699

Client Data
Name: CDIM Engineering
Project: 101-001-LRTC, Task 1
Date Collected: 08-Dec-2016 9:05

Sample Data
Matrix: Water
Sample Size: 0.987 L

Laboratory Data
Lab Sample: 1601548-01 Date Received: 09-Dec-2016 9:37
QC Batch: B6L0072 Date Extracted: 14-Dec-2016 7:30
Date Analyzed: 29-Dec-16 05:35 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	67.1			B
alpha-BHC	75.5			
Lindane (gamma-BHC)	86.8			
beta-BHC	69.2			
delta-BHC	ND	5.59		
Heptachlor	ND	9.54		
Aldrin	ND	5.55		
Oxychlordane	ND	23.8		
cis-Heptachlor Epoxide	60.9			
trans-Heptachlor Epoxide	121			
trans-Chlordane (gamma)	ND		72.8	
trans-Nonachlor	58.3			
cis-Chlordane (alpha)	ND		134	
Endosulfan I (alpha)	ND	42.7		
2,4'-DDE	25.5			J
4,4'-DDE	381			
Dieldrin	1460			
Endrin	470			
cis-Nonachlor	ND	52.0		
Endosulfan II (beta)	ND	168		
2,4'-DDD	194			
2,4'-DDT	233			
4,4'-DDD	410			
4,4'-DDT	951			
Endosulfan Sulfate	ND	306		
4,4'-Methoxychlor	ND	241		
Mirex	ND	30.9		
Endrin Aldehyde	ND	220		
Endrin Ketone	726			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	84.2	5 - 120	
IS	13C6-alpha-BHC	122	32 - 130	
IS	13C6-Lindane (gamma-BHC)	113	11 - 120	
IS	13C6-beta-BHC	90.8	32 - 130	
IS	13C6-delta-BHC	83.8	36 - 137	
IS	13C10-Heptachlor	111	5 - 120	
IS	13C12-Aldrin	60.2	5 - 120	
IS	13C10-Oxychlordane	58.7	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	51.1	27 - 137	
IS	13C10-trans-Chlordane (gamma)	46.6	21 - 132	
IS	13C10-trans-Nonachlor	45.7	14 - 136	
IS	13C9-Endosulfan I (alpha)	45.1	15 - 148	
IS	13C12-2,4'-DDE	43.4	47 - 160	H
IS	13C12-4,4'-DDE	32.4	47 - 160	H
IS	13C12-Dieldrin	40.8	40 - 151	
IS	13C12-Endrin	41.2	35 - 155	
IS	13C10-cis-Nonachlor	23.0	36 - 139	H
IS	13C9-Endosulfan II (beta)	28.1	5 - 122	
IS	13C12-2,4'-DDD	51.4	5 - 199	
IS	13C12-2,4'-DDT	45.8	5 - 199	
IS	13C12-4,4'-DDD	31.9	5 - 120	
IS	13C12-4,4'-DDT	29.4	5 - 120	
IS	13C9-Endosulfan Sulfate	44.9	15 - 148	
IS	13C12-Methoxychlor	65.2	5 - 120	
IS	13C10-Mirex	37.5	5 - 120	
IS	13C12-Endrin Aldehyde	26.7	15 - 148	
IS	13C12-Endrin Ketone	43.0	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank.**
D	**Dilution**
E	**The associated compound concentration exceeded the calibration range of the instrument.**
H	**Recovery and/or RPD was outside laboratory acceptance limits.**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ.**
M	**Estimated Maximum Possible Concentration. (CA Region 2 projects only)**
*****	**See Cover Letter**
Conc.	**Concentration**
NA	**Not applicable**
ND	**Not Detected**
TEQ	**Toxic Equivalency**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2014022
Nevada Division of Environmental Protection	CA004132015-1
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-004
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Chain of Custody Record

1601548

4.5°C

Vista Analytical
1104 Windfield Way
El Dorado Hills, CA 95762
Phone: (916) 673-1520

Please send analytic results, electronic deliverables and the original chain-of-custody form to:
sab@cdimengineering.com
mec@cdimengineering.com

INSTRUCTIONS FOR LAB PERSONNEL:
GeoTracker EDF required? o Yes x No
Equis 4-file EDWEDD required? x Yes □ No
Specify analytic/prep method and detection limit in report.
Notify us of any anomalous peaks in GC or other scans.
Call immediately with any questions or problems.

Client Contact	Project Manager: Scott Bourne	Protocol ID/path:	COC Number:
CDIM ENGINEERING	Project ID: 101-001-LRTC, Task 1		
45 POLK STREET, 3RD FLOOR	Sampled by: MEC		Page 1 of 1
SAN FRANCISCO, CA	Sample date(s): 12/9/16		
(415) 498-0535 PHONE	**Analysis Turnaround Time:**		SDG number:
	Standard		
Job Name: LRTC Annual Storm Water Sampling	(Specify Days or Hours)		
Address: Levin Richmond Terminal, 402 Wright Avenue, Richmond, CA 94804			Sample Specific Notes:

Lab ID	Sample Identification	Sample Date	Sample Time	Sample Matrix	# of Cont.	Analyte (Method ID)	Pesticides (EPA 1699)
	TS2-E-161208	12/9/16	0905	W	3		X
					Field Filtered (X):		
					Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____		1

Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Please use agreed upon analyte list for EPA 1699.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
MCONNINGHAM	CDIM	12/9/16 1200		VAL	12/09/16 0940
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

x = Samples released to a secured, locked area.

● = Samples received from a secured, locked area

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1601548 **TAT** Std

Samples Arrival:	**Date/Time** 12/09/16 0937	**Initials:** CDB	**Location:** WR 2 **Shelf/Rack:** NA
Logged In:	**Date/Time** 12/09/16 1616	**Initials:** JBB	**Location:** WR-2 **Shelf/Rack:** C4

Delivered By:	FedEx	UPS	On Trac	DHL	Hand Delivered	Other
Preservation:	Ice	Blue Ice	Dry Ice	None		
Temp °C: 4.8 (uncorrected)	**Time:** 0940		**Thermometer ID:** IR-1			
Temp °C: 4.5 (corrected)	**Probe used: Yes☐ No☑**					

	YES	NO	NA
Adequate Sample Volume Received? A,B,C	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Shipping Documentation Present?	✓		
Airbill Trk # 784919334582	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Preservation Documented:	$Na_2S_2O_3$	Trizma			Yes	No NA
Shipping Container	Vista	Client	Retain	Return	Dispose	

Comments:

January 12, 2017

Vista Work Order No. 1700005

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 04, 2017. This sample set was analyzed on a standard turn-around time, under your Project Name 'LRTC Annual Storm Water Sampling'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 1700005
Case Narrative

Sample Condition on Receipt:

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1699

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1700005-01	TS2-E-170103	03-Jan-17 12:15	04-Jan-17 10:11	Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L

Vista Project: 1700005

Client Project: LRTC Annual Storm Water Sampling

ANALYTICAL RESULTS

Sample ID: Method Blank

EPA Method 1699

Matrix: Aqueous
Sample Size: 1.00 L

QC Batch: B7A0011
Date Extracted: 05-Jan-2017 8:21

Lab Sample: B7A0011-BLK1
Date Analyzed: 06-Jan-17 23:06 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	ND		3.13	
alpha-BHC	ND	4.96		
Lindane (gamma-BHC)	ND	8.79		
beta-BHC	ND	7.62		
delta-BHC	ND	5.79		
Heptachlor	ND	1.94		
Aldrin	ND	1.42		
Oxychlordane	ND	5.32		
cis-Heptachlor Epoxide	ND	4.11		
trans-Heptachlor Epoxide	ND	9.98		
trans-Chlordane (gamma)	ND	3.83		
trans-Nonachlor	ND	3.66		
cis-Chlordane (alpha)	ND	3.65		
Endosulfan I (alpha)	ND	5.92		
2,4'-DDE	ND	1.82		
4,4'-DDE	ND	2.00		
Dieldrin	ND	1.92		
Endrin	ND	5.37		
cis-Nonachlor	ND	4.02		
Endosulfan II (beta)	ND	11.9		
2,4'-DDD	ND	1.95		
2,4'-DDT	ND	3.81		
4,4'-DDD	ND	2.08		
4,4'-DDT	ND	4.02		
Endosulfan Sulfate	ND	8.30		
4,4'-Methoxychlor	ND	3.57		
Mirex	ND	1.38		
Endrin Aldehyde	ND	7.71		
Endrin Ketone	ND	11.9		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	65.4	5 - 120	
IS	13C6-alpha-BHC	79.5	32 - 130	
IS	13C6-Lindane (gamma-BHC)	81.3	11 - 120	
IS	13C6-beta-BHC	91.1	32 - 130	
IS	13C6-delta-BHC	91.2	36 - 137	
IS	13C10-Heptachlor	62.1	5 - 120	
IS	13C12-Aldrin	81.4	5 - 120	
IS	13C10-Oxychlordane	90.6	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	84.9	27 - 137	
IS	13C10-trans-Chlordane (gamma)	89.0	21 - 132	
IS	13C10-trans-Nonachlor	78.0	14 - 136	
IS	13C9-Endosulfan I (alpha)	79.4	15 - 148	
IS	13C12-2,4'-DDE	89.7	47 - 160	
IS	13C12-4,4'-DDE	95.7	47 - 160	
IS	13C12-Dieldrin	90.9	40 - 151	
IS	13C12-Endrin	88.9	35 - 155	
IS	13C10-cis-Nonachlor	89.1	36 - 139	
IS	13C9-Endosulfan II (beta)	85.6	5 - 122	
IS	13C12-2,4'-DDD	98.5	5 - 199	
IS	13C12-2,4'-DDT	96.5	5 - 199	
IS	13C12-4,4'-DDD	98.1	5 - 120	
IS	13C12-4,4'-DDT	96.6	5 - 120	
IS	13C9-Endosulfan Sulfate	88.9	15 - 148	
IS	13C12-Methoxychlor	81.3	5 - 120	
IS	13C10-Mirex	87.1	5 - 120	
IS	13C12-Endrin Aldehyde	69.9	15 - 148	
IS	13C12-Endrin Ketone	82.1	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous
Sample Size: 1.00 L

QC Batch: B7A0011
Date Extracted: 05-Jan-2017 8:21

Lab Sample: B7A0011-BS1
Date Analyzed: 06-Jan-17 21:31 Column: ZB-50

Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits
Hexachlorobenzene	998	1000	99.8	50 - 120
alpha-BHC	985	1000	98.5	50 - 120
Lindane (gamma-BHC)	1050	1000	105	50 - 120
beta-BHC	996	1000	99.6	50 - 120
delta-BHC	930	1000	93.0	50 - 120
Heptachlor	1170	1000	117	50 - 120
Aldrin	950	1000	95.0	50 - 120
Oxychlordane	1060	1000	106	50 - 120
cis-Heptachlor Epoxide	1050	1000	105	50 - 120
trans-Heptachlor Epoxide	873	1000	87.3	50 - 120
trans-Chlordane (gamma)	979	1000	97.9	50 - 120
trans-Nonachlor	928	1000	92.8	50 - 120
cis-Chlordane (alpha)	1020	1000	102	50 - 120
Endosulfan I (alpha)	995	1000	99.5	50 - 120
2,4'-DDE	952	1000	95.2	24 - 123
4,4'-DDE	893	1000	89.3	50 - 120
Dieldrin	1010	1000	101	50 - 120
Endrin	1140	1000	114	50 - 120
cis-Nonachlor	941	1000	94.1	50 - 120
Endosulfan II (beta)	940	1000	94.0	5 - 200
2,4'-DDD	976	1000	97.6	50 - 120
2,4'-DDT	970	1000	97.0	50 - 120
4,4'-DDD	998	1000	99.8	42 - 120
4,4'-DDT	991	1000	99.1	50 - 120
Endosulfan Sulfate	1100	1000	110	50 - 120
4,4'-Methoxychlor	965	1000	96.5	50 - 120
Mirex	966	1000	96.6	50 - 120
Endrin Aldehyde	1040	1000	104	50 - 134
Endrin Ketone	925	1000	92.5	50 - 134

	Labeled Standard	%R	LCL-UCL
IS	13C6-Hexachlorobenzene	71.2	5 - 120
IS	13C6-alpha-BHC	84.5	17 - 141
IS	13C6-Lindane (gamma-BHC)	88.9	5 - 124
IS	13C6-beta-BHC	103	17 - 141
IS	13C6-delta-BHC	105	16 - 150
IS	13C10-Heptachlor	72.9	5 - 128
IS	13C12-Aldrin	90.3	5 - 126
IS	13C10-Oxychlordane	94.6	5 - 144
IS	13C10-cis-Heptachlor Epoxide	97.6	8 - 146
IS	13C10-trans-Chlordane (gamma)	99.1	15 - 144
IS	13C10-trans-Nonachlor	94.8	13 - 149
IS	13C9-Endosulfan I (alpha)	94.3	5 - 144
IS	13C12-2,4'-DDE	96.3	26 - 169
IS	13C12-4,4'-DDE	100	26 - 169
IS	13C12-Dieldrin	88.9	19 - 161
IS	13C12-Endrin	89.7	20 - 157
IS	13C10-cis-Nonachlor	105	17 - 154
IS	13C9-Endosulfan II (beta)	98.5	5 - 120
IS	13C12-2,4'-DDD	109	14 - 200
IS	13C12-2,4'-DDT	112	14 - 200
IS	13C12-4,4'-DDD	111	14 - 200
IS	13C12-4,4'-DDT	114	13 - 200
IS	13C9-Endosulfan Sulfate	93.5	5 - 144
IS	13C12-Methoxychlor	103	8 - 200
IS	13C10-Mirex	104	5 - 138
IS	13C12-Endrin Aldehyde	75.0	5 - 144
IS	13C12-Endrin Ketone	101	5 - 144

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-E-170103

EPA Method 1699

Client Data
Name: CDIM Engineering
Project: LRTC Annual Storm Water Sampling
Date Collected: 03-Jan-2017 12:15

Sample Data
Matrix: Water
Sample Size: 1.00 L

Laboratory Data
Lab Sample: 1700005-01 Date Received: 04-Jan-2017 10:11
QC Batch: B7A0011 Date Extracted: 05-Jan-2017 8:21
Date Analyzed: 07-Jan-17 03:05 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	27.9			J
alpha-BHC	41.4			
Lindane (gamma-BHC)	88.1			
beta-BHC	57.8			
delta-BHC	ND	5.38		
Heptachlor	ND	11.1		
Aldrin	ND	3.83		
Oxychlordane	ND	18.3		
cis-Heptachlor Epoxide	ND		123	
trans-Heptachlor Epoxide	804			
trans-Chlordane (gamma)	ND		87.6	
trans-Nonachlor	54.3			
cis-Chlordane (alpha)	223			
Endosulfan I (alpha)	ND	15.6		
2,4'-DDE	27.6			J
4,4'-DDE	207			
Dieldrin	1300			
Endrin	356			
cis-Nonachlor	ND	10.1		
Endosulfan II (beta)	ND	40.5		
2,4'-DDD	378			
2,4'-DDT	307			
4,4'-DDD	770			
4,4'-DDT	767			
Endosulfan Sulfate	ND	23.6		
4,4'-Methoxychlor	ND	32.5		
Mirex	ND	2.36		
Endrin Aldehyde	ND	12.8		
Endrin Ketone	433			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	75.7	5 - 120	
IS	13C6-alpha-BHC	81.6	32 - 130	
IS	13C6-Lindane (gamma-BHC)	90.8	11 - 120	
IS	13C6-beta-BHC	98.1	32 - 130	
IS	13C6-delta-BHC	103	36 - 137	
IS	13C10-Heptachlor	81.0	5 - 120	
IS	13C12-Aldrin	92.2	5 - 120	
IS	13C10-Oxychlordane	95.0	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	99.8	27 - 137	
IS	13C10-trans-Chlordane (gamma)	90.6	21 - 132	
IS	13C10-trans-Nonachlor	90.5	14 - 136	
IS	13C9-Endosulfan I (alpha)	92.2	15 - 148	
IS	13C12-2,4'-DDE	95.2	47 - 160	
IS	13C12-4,4'-DDE	102	47 - 160	
IS	13C12-Dieldrin	91.0	40 - 151	
IS	13C12-Endrin	88.4	35 - 155	
IS	13C10-cis-Nonachlor	93.8	36 - 139	
IS	13C9-Endosulfan II (beta)	77.9	5 - 122	
IS	13C12-2,4'-DDD	130	5 - 199	
IS	13C12-2,4'-DDT	82.5	5 - 199	
IS	13C12-4,4'-DDD	97.1	5 - 120	
IS	13C12-4,4'-DDT	67.3	5 - 120	
IS	13C9-Endosulfan Sulfate	64.5	15 - 148	
IS	13C12-Methoxychlor	37.1	5 - 120	
IS	13C10-Mirex	57.5	5 - 120	
IS	13C12-Endrin Aldehyde	53.5	15 - 148	
IS	13C12-Endrin Ketone	50.2	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank.**
D	**Dilution**
E	**The associated compound concentration exceeded the calibration range of the instrument.**
H	**Recovery and/or RPD was outside laboratory acceptance limits.**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ.**
M	**Estimated Maximum Possible Concentration. (CA Region 2 projects only)**
*****	**See Cover Letter**
Conc.	**Concentration**
NA	**Not applicable**
ND	**Not Detected**
TEQ	**Toxic Equivalency**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2014022
Nevada Division of Environmental Protection	CA004132015-1
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-004
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Chain of Custody Record

1700005
1700004 BDB

0.5

Vista Analytical
1104 Windfield Way
El Dorado Hills, CA 95762
Phone: (916) 673-1520

Please send analytic results, electronic deliverables and the original chain-of-custody form to:
sab@cdimengineering.com
mec@cdimengineering.com

INSTRUCTIONS FOR LAB PERSONNEL:
GeoTracker EDF required? o Yes x No
Equis 4-file EDWEDD required? x Yes □ No
Specify analytic/prep method and detection limit in report.
Notify us of any anomalous peaks in GC or other scans.
Call immediately with any questions or problems.

Client Contact	Project Manager: Scott Bourne
CDIM ENGINEERING	Project ID: 101-001-LRTC, Task 1
45 POLK STREET, 3RD FLOOR	Sampled by: M Cunningham
SAN FRANCISCO, CA	Sample date(s): 1/3/17
(415) 498-0535 PHONE	**Analysis Turnaround Time:**
	Standard
Job Name: LRTC Annual Storm Water Sampling	(Specify Days or Hours)
Address: Levin Richmond Terminal, 402 Wright Avenue, Richmond, CA 94804	

Protocol ID/path:

COC Number:

Page 1 of 1

SDG number:

Lab ID	Sample Identification	Sample Date	Sample Time	Sample Matrix	# of Cont.	Analyte (Method ID): Pesticides (EPA 1699)	Sample Specific Notes:
	TS2-E-170103	1/3/17	1215	W	3	X	
					Field Filtered (X):		
					Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other	1	

Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Please use agreed upon analyte list for EPA 1699.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
M Cunningham x	CDIM	1/3/17 1400	Patti Benedict ○	VAL	01/04/17 1026
Relinquished by: □	Company:	Date/Time:	Received by: ○	Company:	Date/Time:
Relinquished by: □	Company:	Date/Time:	Received by: ○	Company:	Date/Time:

x = Samples released to a secured, locked area.

● = Samples received from a secured, locked area

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1700005 **TAT** Std

Samples Arrival:	**Date/Time** 01/04/17 1011	**Initials:** BZB	**Location:** WR-2 **Shelf/Rack:** NA
Logged In:	**Date/Time** 01/04/17 1109	**Initials:** BZB	**Location:** WR-2 **Shelf/Rack:** B5

Delivered By:	FedEx	UPS	On Trac	DHL	Hand Delivered	Other
Preservation:	Ice	Blue Ice		Dry Ice	None	

Temp °C: 0.8	(uncorrected)	**Time:** 1025	**Thermometer ID:** IR-1
Temp °C: 0.5	(corrected)	**Probe used:** Yes☐ No☑	

	YES	NO	NA
Adequate Sample Volume Received? A,B,C bottles	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		✓
Shipping Custody Seals Intact?			✓
Shipping Documentation Present?	✓		
Airbill Trk # 7805208338350	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	

If Chlorinated or Drinking Water Samples, Acceptable Preservation?						✓
Preservation Documented:	$Na_2S_2O_3$	Trizma			Yes	No	NA
Shipping Container	Vista	Client	Retain	Return	Dispose		

Comments: "TS2-E-170103" A,B,C

February 10, 2017

Vista Work Order No. 1700096

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 20, 2017. This sample set was analyzed on a standard turn-around time, under your Project Name '101-001-LRTC, Task 1'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1700096
Case Narrative

Sample Condition on Receipt:

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1699

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
B7A0089-BLK1	B7A0089-BLK1	EPA Method 1699	13C12-4,4'-DDD	H	121
B7A0089-BLK1	B7A0089-BLK1	EPA Method 1699	13C10-Mirex	H	125
B7A0089-BLK1	B7A0089-BLK1	EPA Method 1699	13C12-Endrin Aldehyde	H	12.8

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1700096-01	TS2-E-170118	18-Jan-17 14:05	20-Jan-17 09:29	Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L
				Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank — EPA Method 1699

Matrix: Aqueous
Sample Size: 1.00 L

QC Batch: B7A0089
Date Extracted: 23-Jan-2017 8:57

Lab Sample: B7A0089-BLK1
Date Analyzed: 07-Feb-17 20:14 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	ND		3.71	
alpha-BHC	ND	5.91		
Lindane (gamma-BHC)	ND	7.45		
beta-BHC	ND	10.2		
delta-BHC	ND	7.57		
Heptachlor	ND	1.36		
Aldrin	ND	1.74		
Oxychlordane	ND	3.78		
cis-Heptachlor Epoxide	ND	3.23		
trans-Heptachlor Epoxide	ND	11.9		
trans-Chlordane (gamma)	ND	3.42		
trans-Nonachlor	ND	3.18		
cis-Chlordane (alpha)	ND	3.16		
Endosulfan I (alpha)	ND	4.94		
2,4'-DDE	ND	3.35		
4,4'-DDE	ND	4.13		
Dieldrin	ND	1.93		
Endrin	ND	6.56		
cis-Nonachlor	ND	2.96		
Endosulfan II (beta)	ND	21.6		
2,4'-DDD	ND	6.11		
2,4'-DDT	ND	12.6		
4,4'-DDD	ND	6.92		
4,4'-DDT	ND	13.1		
Endosulfan Sulfate	ND	21.6		
4,4'-Methoxychlor	ND	3.87		
Mirex	ND	0.829		
Endrin Aldehyde	ND	43.0		
Endrin Ketone	ND	17.8		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	61.9	5 - 120	
IS	13C6-alpha-BHC	78.7	32 - 130	
IS	13C6-Lindane (gamma-BHC)	85.0	11 - 120	
IS	13C6-beta-BHC	88.4	32 - 130	
IS	13C6-delta-BHC	87.7	36 - 137	
IS	13C10-Heptachlor	56.0	5 - 120	
IS	13C12-Aldrin	56.4	5 - 120	
IS	13C10-Oxychlordane	64.4	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	63.1	27 - 137	
IS	13C10-trans-Chlordane (gamma)	69.5	21 - 132	
IS	13C10-trans-Nonachlor	93.4	14 - 136	
IS	13C9-Endosulfan I (alpha)	101	15 - 148	
IS	13C12-2,4'-DDE	106	47 - 160	
IS	13C12-4,4'-DDE	102	47 - 160	
IS	13C12-Dieldrin	101	40 - 151	
IS	13C12-Endrin	77.4	35 - 155	
IS	13C10-cis-Nonachlor	104	36 - 139	
IS	13C9-Endosulfan II (beta)	43.3	5 - 122	
IS	13C12-2,4'-DDD	124	5 - 199	
IS	13C12-2,4'-DDT	104	5 - 199	
IS	13C12-4,4'-DDD	121	5 - 120	H
IS	13C12-4,4'-DDT	105	5 - 120	
IS	13C9-Endosulfan Sulfate	51.3	15 - 148	
IS	13C12-Methoxychlor	47.6	5 - 120	
IS	13C10-Mirex	125	5 - 120	H
IS	13C12-Endrin Aldehyde	12.8	15 - 148	H
IS	13C12-Endrin Ketone	43.4	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix:	Aqueous	QC Batch:	B7A0089	Lab Sample:	B7A0089-BS1
Sample Size:	1.00 L	Date Extracted:	23-Jan-2017 8:57	Date Analyzed:	06-Feb-17 15:17 Column: ZB-50

Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits
Hexachlorobenzene	960	1000	96.0	50 - 120
alpha-BHC	940	1000	94.0	50 - 120
Lindane (gamma-BHC)	948	1000	94.8	50 - 120
beta-BHC	963	1000	96.3	50 - 120
delta-BHC	946	1000	94.6	50 - 120
Heptachlor	933	1000	93.3	50 - 120
Aldrin	941	1000	94.1	50 - 120
Oxychlordane	996	1000	99.6	50 - 120
cis-Heptachlor Epoxide	1030	1000	103	50 - 120
trans-Heptachlor Epoxide	1190	1000	119	50 - 120
trans-Chlordane (gamma)	920	1000	92.0	50 - 120
trans-Nonachlor	1060	1000	106	50 - 120
cis-Chlordane (alpha)	1140	1000	114	50 - 120
Endosulfan I (alpha)	872	1000	87.2	50 - 120
2,4'-DDE	944	1000	94.4	24 - 123
4,4'-DDE	935	1000	93.5	50 - 120
Dieldrin	991	1000	99.1	50 - 120
Endrin	1010	1000	101	50 - 120
cis-Nonachlor	1060	1000	106	50 - 120
Endosulfan II (beta)	896	1000	89.6	5 - 200
2,4'-DDD	987	1000	98.7	50 - 120
2,4'-DDT	997	1000	99.7	50 - 120
4,4'-DDD	983	1000	98.3	42 - 120
4,4'-DDT	980	1000	98.0	50 - 120
Endosulfan Sulfate	888	1000	88.8	50 - 120
4,4'-Methoxychlor	1040	1000	104	50 - 120
Mirex	997	1000	99.7	50 - 120
Endrin Aldehyde	919	1000	91.9	50 - 134
Endrin Ketone	1050	1000	105	50 - 134

	Labeled Standard	%R	LCL-UCL
IS	13C6-Hexachlorobenzene	69.1	5 - 120
IS	13C6-alpha-BHC	72.4	17 - 141
IS	13C6-Lindane (gamma-BHC)	74.4	5 - 124
IS	13C6-beta-BHC	77.9	17 - 141
IS	13C6-delta-BHC	85.3	16 - 150
IS	13C10-Heptachlor	53.2	5 - 128
IS	13C12-Aldrin	56.6	5 - 126
IS	13C10-Oxychlordane	65.2	5 - 144
IS	13C10-cis-Heptachlor Epoxide	64.9	8 - 146
IS	13C10-trans-Chlordane (gamma)	81.6	15 - 144
IS	13C10-trans-Nonachlor	90.5	13 - 149
IS	13C9-Endosulfan I (alpha)	111	5 - 144
IS	13C12-2,4'-DDE	118	26 - 169
IS	13C12-4,4'-DDE	113	26 - 169
IS	13C12-Dieldrin	128	19 - 161
IS	13C12-Endrin	87.5	20 - 157
IS	13C10-cis-Nonachlor	103	17 - 154
IS	13C9-Endosulfan II (beta)	101	5 - 120
IS	13C12-2,4'-DDD	103	14 - 200
IS	13C12-2,4'-DDT	88.0	14 - 200
IS	13C12-4,4'-DDD	98.0	14 - 200
IS	13C12-4,4'-DDT	84.9	13 - 200
IS	13C9-Endosulfan Sulfate	105	5 - 144
IS	13C12-Methoxychlor	67.5	8 - 200
IS	13C10-Mirex	112	5 - 138
IS	13C12-Endrin Aldehyde	76.5	5 - 144
IS	13C12-Endrin Ketone	68.8	5 - 144

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-E-170118

EPA Method 1699

Client Data
Name: CDIM Engineering
Project: 101-001-LRTC, Task 1
Date Collected: 18-Jan-2017 14:05

Sample Data
Matrix: Water
Sample Size: 1.01 L

Laboratory Data
Lab Sample: 1700096-01 Date Received: 20-Jan-2017 9:29
QC Batch: B7A0089 Date Extracted: 23-Jan-2017 8:57
Date Analyzed: 06-Feb-17 22:31 Column: ZB-50

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
Hexachlorobenzene	29.1			J
alpha-BHC	52.5			
Lindane (gamma-BHC)	48.8			
beta-BHC	191			
delta-BHC	ND	2.89		
Heptachlor	ND	2.02		
Aldrin	ND	5.49		
Oxychlordane	ND	15.3		
cis-Heptachlor Epoxide	204			
trans-Heptachlor Epoxide	803			
trans-Chlordane (gamma)	132			
trans-Nonachlor	60.4			
cis-Chlordane (alpha)	378			
Endosulfan I (alpha)	ND	21.0		
2,4'-DDE	24.2			J
4,4'-DDE	191			
Dieldrin	2770			
Endrin	769			
cis-Nonachlor	ND	22.8		
Endosulfan II (beta)	ND	80.4		
2,4'-DDD	409			
2,4'-DDT	266			
4,4'-DDD	700			
4,4'-DDT	619			
Endosulfan Sulfate	ND	118		
4,4'-Methoxychlor	ND	16.1		
Mirex	ND	12.0		
Endrin Aldehyde	ND	47.5		
Endrin Ketone	1960			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C6-Hexachlorobenzene	14.4	5 - 120	
IS	13C6-alpha-BHC	83.5	32 - 130	
IS	13C6-Lindane (gamma-BHC)	87.8	11 - 120	
IS	13C6-beta-BHC	94.4	32 - 130	
IS	13C6-delta-BHC	95.4	36 - 137	
IS	13C10-Heptachlor	98.1	5 - 120	
IS	13C12-Aldrin	81.3	5 - 120	
IS	13C10-Oxychlordane	91.4	23 - 135	
IS	13C10-cis-Heptachlor Epoxide	91.3	27 - 137	
IS	13C10-trans-Chlordane (gamma)	86.1	21 - 132	
IS	13C10-trans-Nonachlor	125	14 - 136	
IS	13C9-Endosulfan I (alpha)	113	15 - 148	
IS	13C12-2,4'-DDE	135	47 - 160	
IS	13C12-4,4'-DDE	126	47 - 160	
IS	13C12-Dieldrin	140	40 - 151	
IS	13C12-Endrin	139	35 - 155	
IS	13C10-cis-Nonachlor	103	36 - 139	
IS	13C9-Endosulfan II (beta)	89.0	5 - 122	
IS	13C12-2,4'-DDD	118	5 - 199	
IS	13C12-2,4'-DDT	89.4	5 - 199	
IS	13C12-4,4'-DDD	87.8	5 - 120	
IS	13C12-4,4'-DDT	68.4	5 - 120	
IS	13C9-Endosulfan Sulfate	63.9	15 - 148	
IS	13C12-Methoxychlor	30.6	5 - 120	
IS	13C10-Mirex	45.3	5 - 120	
IS	13C12-Endrin Aldehyde	57.2	15 - 148	
IS	13C12-Endrin Ketone	40.9	15 - 148	

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank.**
D	**Dilution**
E	**The associated compound concentration exceeded the calibration range of the instrument.**
H	**Recovery and/or RPD was outside laboratory acceptance limits.**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ.**
M	**Estimated Maximum Possible Concentration. (CA Region 2 projects only)**
*****	**See Cover Letter**
Conc.	**Concentration**
NA	**Not applicable**
ND	**Not Detected**
TEQ	**Toxic Equivalency**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
California Department of Health – ELAP	2892
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Florida Department of Health	E87777
Hawaii Department of Health	N/A
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New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-004
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

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NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Chain of Custody Record

1700096

0.6°C

Vista Analytical
1104 Windfield Way
El Dorado Hills, CA 95762
Phone: (916) 673-1520

Please send analytic results, electronic deliverables and the original chain-of-custody form to:
sab@cdimengineering.com
mec@cdimengineering.com

INSTRUCTIONS FOR LAB PERSONNEL:
GeoTracker EDF required? o Yes x No
Equis 4-file EDWEDD required? x Yes □ No
Specify analytic/prep method and detection limit in report.
Notify us of any anomalous peaks in GC or other scans.
Call immediately with any questions or problems.

Client Contact	Project Manager: Scott Bourne	Protocol ID/path:	COC Number:
CDIM ENGINEERING	Project ID: 101-001-LRTC, Task 1		
45 POLK STREET, 3RD FLOOR	Sampled by: MEC		Page 1 of 1
SAN FRANCISCO, CA	Sample date(s): 1/19/17		
(415) 498-0535 PHONE	**Analysis Turnaround Time:**		SDG number:
	Standard		
Job Name: LRTC Annual Storm Water Sampling	(Specify Days or Hours)		
Address: Levin Richmond Terminal, 402 Wright Avenue, Richmond, CA 94804			

Lab ID	Sample Identification	Sample Date	Sample Time	Sample Matrix	# of Cont.	Analyte (Method ID): Pesticides (EPA 1699)	Sample Specific Notes:
	TS2-E-170118	1/19/17	1405	W	3	X	
					Field Filtered (X):		
					Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other	1	

Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Please use agreed upon analyte list for EPA 1699.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
MCunningham x	CDIM ENG	1/19/17 1300		VAL	01/20/17 0932
Relinquished by: □	Company:	Date/Time:	Received by: ○	Company:	Date/Time:
Relinquished by: □	Company:	Date/Time:	Received by: ○	Company:	Date/Time:

x = Samples released to a secured, locked area.

● = Samples received from a secured, locked area

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1700096 TAT Std

Samples Arrival:	Date/Time 01/20/17 0929		Initials: GBB		Location: WR-2 Shelf/Rack: NA		
Logged In:	Date/Time 01/20/17 1013		Initials: GBB		Location: WR-2 Shelf/Rack: A3		
Delivered By:	FedEx	UPS	On Trac	DHL	Hand Delivered	Other	
Preservation:	Ice	Blue Ice		Dry Ice	None		
Temp °C: 0.9 (uncorrected)		Time: 0931					
Temp °C: 0.6 (corrected)		Probe used: Yes☐ No☑			Thermometer ID: IR-1		

	YES	NO	NA
Adequate Sample Volume Received? A,B,C	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Shipping Documentation Present?	✓		
Airbill Trk # 7853 6823 4823	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓
Preservation Documented: $Na_2S_2O_3$ Trizma	Yes	No	NA
Shipping Container: Vista / Client / Retain / Return		Dispose	

Comments:

APPENDIX C

Upland Capping System Inspection Form

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

I. General Information

Site: Former United Heckathorn Superfund Site, Levin Richmond Terminal
Address: 402 Wright Avenue, Richmond, CA
Inspector: Mary Cunningham, PE and Scott Bourne, PE
Organization: CDIM Engineering
Date and time of inspection:

II. Upland Area Concrete Cap, Gravel Cover, and Drainage System Observations

Note significant cracks, holes, penetrations, damage, settlement, or any exposure of underlying soil in any component of the capping system.

North Main Terminal (SW-3)

	Yes	No	N/A	Comments
Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?	X			
Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?	X			
Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?	X			
Is accumulated sediment observed in the interceptors or drain inlets? If yes, note location and photograph.		X		*Interceptors not accessed during this inspection. Drain inlets have inlet protection.*
Are corrective actions required?		X		
Attach a photograph of areas requiring corrective action.			X	

Describe any recent repairs/maintenance:

All interceptors in Upland Area cleaned prior to the 2016-2017 wet season. This is performed annually during dry weather and as-needed throughout the storm season.

Drain inlets are equipped with drain inlet filters, which are observed during regular BMP inspections of the site and replaced as-needed, or at least once per year prior to the wet season.

Concrete was added along dock to widen road (bents 1-20) in previous year. During 2016-2017, curbing was added. This did not result in exposure of underlying soil.

Describe conditions and locations of the capping system which require attention:

A large stockpile was present in the secondary storage area, so this area of the cap was not accessed for inspection.

Sinking/degraded pavement was observed in a small area to the south of the cap. While this is outside to fhte Heckathorn cap, LRTC plans to remove the affected section and re-pour concrete.

Describe corrective actions required and their date(s) of implementation:

None.

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-4)

	Yes	No	N/A	Comments
Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?	X			
Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?	X			
Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?	X			
Is accumulated sediment observed in the interceptors or drain inlets? If yes, note location and photograph.		X		*Interceptors not accessed during this inspection. Drain inlets have inlet protection.*
Are corrective actions required?		X		
Attach a photograph of areas requiring corrective action.			X	

Describe any recent repairs/maintenance:

LRTC installed asphalt between rail lines in SW-4 area to replace previously graveled area.

See SW-3 section for discussion of road widening work in this area.

Describe conditions and locations of the capping system which require attention:

A long seam and surficial cracking was noted in the roadway north of the secondary storage area. No change was observed from previous year, but it should continue to be monitored.

Describe corrective actions required and their date(s) of implementation:

None.

Signature: Date:

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-5)

	Yes	No	N/A	Comments
Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?	X			
Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?	X			
Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?	X			
Is accumulated sediment observed in the interceptors or drain inlets? If yes, note location and photograph.		X		*Interceptors not accessed during this inspection. Drain inlets have inlet protection.*
Are corrective actions required?		X		
Attach a photograph of areas requiring corrective action.			X	

Describe any recent repairs/maintenance:

A roadway has been installed in the SW-5/SW-6 catchment areas. Work began in 2015-2016 reporting year with concrete placement, and was completed this year with asphalt paving. The road crosses rail tracks and replaced gravel areas, increasing the paved portion of the site.

Describe conditions and locations of the capping system which require attention:

Minor pavement deterioration noted adjacent to gate/guard shack. No change noted from previous years, but area should continue to be monitored.

Gravel cover should continue to be monitored, and additional gravel placed as needed.

Describe corrective actions required and their date(s) of implementation:

None.

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-6)

	Yes	No	N/A	Comments
Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?	X			
Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?	X			
Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?	X			
Is accumulated sediment observed in the interceptors or drain inlets? If yes, note location and photograph.		X		*Interceptors not accessed during this inspection. Drain inlets have inlet protection.*
Are corrective actions required?		X		
Attach a photograph of areas requiring corrective action.			X	

Describe any recent repairs/maintenance:

See discussion of road paving in SW-5 section. No other repairs/maintenance.

Describe conditions and locations of the capping system which require attention:

Gravel cover should continue to be monitored, and additional gravel placed as needed.

Describe corrective actions required and their date(s) of implementation:

None.

Signature: Date:

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-7)

	Yes	No	N/A	Comments
Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?	X			
Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?	X			
Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?	X			
Is accumulated sediment observed in the interceptors or drain inlets? If yes, note location and photograph.		X		*Interceptors not accessed during this inspection. Drain inlets have inlet protection.*
Are corrective actions required?		X		
Attach a photograph of areas requiring corrective action.			X	

Describe any recent repairs/maintenance:

None.

Describe conditions and locations of the capping system which require attention:

Gravel cover should continue to be monitored, and additional gravel placed as needed.

Describe corrective actions required and their date(s) of implementation:

None.

Signature: Date:

APPENDIX D

Upland Cap Survey Plat

POINT TABLE							
	PREVIOUS SURVEY (BY OTHERS)			SURVEY: MAY 9, 2017			
POINT #	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	2163237.6800	6024596.4500		2163237.6800	6024596.4500		MONUMENT
2	2163265.8500	6023475.4900		2163265.8500	6023475.4900		MONUMENT
4	2159762.3530	6025316.9420	15.164	–	–	–	TBM
10	2163374.0390	6023319.3450	12.900	2163373.9523	6023319.3392	12.90	3A
11	2163375.5790	6023296.1160	13.010	–	–	13.01	3B
12	2164037.4320	6023374.6750	13.229	2164037.3606	6023374.5955	13.22	5A
13	2164036.1170	6023416.5070	13.160	2164036.0760	6023416.4014	13.16	5B
14	2164035.3860	6023450.0640	12.270	2164035.3260	6023450.0066	12.27	5C
15	2164470.1450	6023411.8380	11.550	2164470.1234	6023411.7101	11.55	6A
16	2164467.3940	6023443.1740	10.890	2164467.4160	6023443.1350	10.89	6B
17	2164536.6770	6023281.0150	12.200	2164536.6437	6023280.8983	12.20	7A
18	2164535.0830	6023328.3880	13.605	2164535.0237	6023328.2973	13.61	7B
19	2164531.9560	6023389.6420	13.500	2164531.9398	6023389.5164	13.50	7C
20	2164538.2420	6023219.0670	11.532	2164538.2420	6023219.0670	11.53	TBM SITE

NOTES:

1. ORIGINAL BASIS OF BEARINGS AND ELEVATION (DONE BY OTHERS): HORIZONTAL CONTROL IS BASED ON A MODIFIED CALIFORNIA COORDINATE SYSTEM. THE BASIS OF BEARING FOR THE MAP IS BETWEEN TWO BRASS DISKS WITHIN STANDARD CITY MONUMENT WELLS LOCATED AT THE INTERSECTIONS OF WRIGHT AVENUE WITH 4TH STREET AND 8TH STREET
THE COORDINATE VALUES AT 4TH STREET = NORTHING 2163265.85, EASTING 6023475.49
THE COORDINATE VALUES AT 8TH STREET = NORTHING 2163237.68, EASTING 6024596.45
VERTICAL CONTROL IS BASED ON TIDAL BENCH MARK STATION DISK STAMPED BM 2 1932, DESIGNATION BEING TIDAL 2 STA III 22 DESCRIBED AS A DISK SET VERTICALLY IN THE GRANITE FOUNDATION AT THE NORTHERN MOST ENTRANCE ON THE WEST SIDE OF THE OLD FORD PLANT. THE DISK HAVING A ELEVATION OF 4.902 FEET MEAN LOWER LOW WATER (MLLW).

2. HORIZONTAL CONTROL WAS ESTABLISHED USING THE PREVIOUS SURVEY'S CONTROL MONUMENTS DESIGNATED AS POINTS 1 AND 2.

3. VERTICAL CONTROL WAS ESTABLISHED USING THE ONSITE TBM DESIGNATED AS POINT 20, BEING THE SW CORNER OF A CONCRETE VAULT WITH AN ELEVATION OF 11.532.

4. POINT #11–3B WAS LOCATED UNDER EQUIPMENT, NORTHING AND EASTING WAS NOT ESTABLISHED. ELEVATION WAS TAKEN AT THE APPROXIMATE LOCATION.

LICENSED LAND SURVEYOR
JOE MURPHY
No. 7269
EXP. 12-31-18
6-22-17
STATE OF CALIFORNIA

DILLON & MURPHY
CONSULTING CIVIL ENGINEERS
ENGINEERING • PLANNING • SURVEYING
847 N. CLUFF AVENUE, SUITE A2, LODI, CALIFORNIA 95240 (209) 334–6613

LEVIN RICHMOND TERMINAL

TOPOGRAPHIC SURVEY

RICHMOND, CALIFORNIA
MAY, 2017

REV. NO.	DESCRIPTION	DATE

SCALE: AS NOTED
DRAWN BY: SM
DESIGNED BY:
CHECKED BY: JM
AS BUILT BY:

BENCH MARK: #20 EL: 11.532
DESCRIPTION: SW CORNER OF CONCRETE STRUCTURE FOR SW#7, BASED ON PREVIOUS SURVEY, DONE BY OTHER.

SHEET 1 OF 1 SHEETS
JOB NO. 1749

S:\2017\1749\Final Monitoring.dwg Jun 22, 2017